EXHIBIT 2

REDACTED

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

IN RE: VALVE ANTITRUST LITIGATION	Case No. 2:21-cv-00563-JCC HIGHLY CONFIDENTIAL – ATTORNEY'S EYES ONLY

CLASS CERTIFICATION EXPERT REPORT OF ASHLEY LANGER, PH.D.

May 17, 2024

HIGHLY CONFIDENTIAL – ATTORNEY'S EYES ONLY

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1.   Introduction

1.1.   Qualifications

1.   I am an economist with expertise in economic modeling, empirical analysis, industrial organization, and government regulation. I received my B.A. in Economics and Mathematical Methods in the Social Sciences from Northwestern University in 2002. After working at the Brookings Institution in Washington, D.C., from 2002 to 2004, I completed my Ph.D. at the University of California, Berkeley, in 2010. My dissertation focused on industrial organization, which includes empirical analysis of firm behavior, competition, and government regulation.

2.   From 2010 to 2012, I was an Assistant Professor of Public Policy at the Ford School of Public Policy at the University of Michigan ("Michigan"). At Michigan, I taught classes in microeconomics, industry structure, government regulation, cost-benefit analysis, and energy policy at the undergraduate and graduate levels.

3.   I am a tenured Associate Professor of Economics at the Eller College of Management at the University of Arizona ("Arizona"), where I have worked since 2012. At Arizona, I have taught classes in principles of economics, business strategy, non-market valuation, environmental economics, and empirical methods for economic research to undergraduates, M.B.A. students, and Ph.D. students. My M.B.A.-level course covers topics in corporate strategy including pricing, investment, product differentiation, platform competition, and competition and antitrust. My Ph.D.-level course covers methods for estimating product demand and supply, pricing decisions, and strategic corporate policy as well as empirical valuation of non-market goods such as the value of information, health and safety, and environmental services.

4.   I am a Research Associate of the National Bureau of Economic Research's ("NBER's") Industrial Organization and Environmental and Energy Economics programs. The NBER is the preeminent professional association of economists in North America, and membership is by invitation only.

5.   My research spans topics in industrial organization, government regulation, consumer decision-making, firm behavior, competition, transportation economics, and energy economics. I employ a wide variety of statistical techniques in my research and contribute

to advancing statistical methods as well as answering questions about measuring consumer preferences and the efficiency of regulatory design. My research articles have been published in leading peer-reviewed journals including the *American Economic Review*, the *Review of Economics and Statistics*, the *Journal of Public Economics*, and the *Journal of Industrial Economics*. I have published multiple articles on analyses of pricing, taxation, consumer demand, and firms' strategic responses to government regulation and to competitors' products. In 2019, I received the Eller College of Management's Dean's Research Award for the best research in the college by an Assistant Professor.

6.   I am frequently asked to review articles for leading economics journals, including the *American Economic Review, Econometrica,* the *Journal of Political Economy,* the *American Economic Journal: Economic Policy,* the *American Economic Journal: Applied Economics,* the *RAND Journal of Economics,* the *Review of Economics and Statistics,* the *International Journal of Industrial Organization,* the *Journal of the Association of Environmental and Resource Economists,* the *Journal of Environmental Economics and Management,* and *Management Science.* I am also on the Board of Editors at the *American Economic Review,* an Associate Editor at the *International Journal of Industrial Organization,* and a member of the Editorial Councils of the *Journal of the Association of Environmental and Resource Economists* and the *Journal of Environmental Economics and Management.* In these contexts, I am asked to provide my expertise on industrial organization and firm behavior, the design and enforcement of regulations and subsidies, consumer decision-making, econometric and statistical methods, policy evaluation, environmental economics, and energy economics, among other topics.

7.   At Arizona, I have served as a doctoral committee member for numerous Ph.D. students researching industrial organization, government regulation, competition, firm behavior, consumer decision-making, and energy economics, among many other topics. I was awarded the Kalt Prize for the best graduate student placement in the college in 2018 and 2024 and the Eller College Outstanding Economics Instructor Award in 2021 and 2024. At Michigan, I was on the Ford School's Faculty Teaching Honor Roll for each of the courses I taught.

8.   I have also provided expert witness testimony in multiple cases. In this work, I have assessed issues related to class certification, liability, and damages. These cases involved various allegations, including allegations of anticompetitive business practices and deceptive business practices. **Appendix A** contains a copy of my curriculum vitae and prior

testimony. **Appendix B** contains the list of the materials I relied upon in forming my opinions.

9.   I am being compensated for my work on this matter at my standard rate of $950 per hour. I have been assisted in this matter by staff of Cornerstone Research, who worked under my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me in this matter. Neither my compensation in this matter nor my compensation from Cornerstone Research is in any way contingent or based on the content of my opinions or the outcome of this or any other matter.

1.2.   Allegations

10. Plaintiffs allege that "Valve requires that publishers offer the best price for their products on Steam, a type of 'most favored nation' ('MFN') provision. A particular type of MFN called a Platform MFN (or 'PMFN') occurs when an online platform requires that providers using its platform not offer their products or services at a lower price on other platforms."[1] In short, Plaintiffs allege that Valve enforces a policy where video game publishers may not offer their products for lower prices on rival PC game distribution platforms. Plaintiffs further allege that "publishers cannot offer exclusive [downloadable content ('DLC')] or earlier release dates for DLC to attract consumers to a different store."[2]

11. Plaintiffs also allege that "Valve uses its dominance over PC game distribution to impose and anticompetitively maintain a 30% commission" on Steam,[3] dominance which is rooted in Valve's alleged platform most favored nation provision ("PMFN").[4] As a result of this allegedly supracompetitive price to publishers (called "revenue share" in Valve's terminology), Plaintiffs allege that "[c]ompetition, output, and innovation are suppressed," "[g]ame quality and choice suffers," "gamers are injured by paying higher retail prices for fewer and lower-quality games," and "Valve's scheme imposes a bloated tax on the PC gaming industry, exploiting publishers reliant on Steam."[5] Plaintiffs claim

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[1]   Consolidated Second Amended Class Action Complaint, *In re: Valve Antitrust Litigation*, March 23, 2023 ("Complaint"), ¶ 156.
[2]   Complaint, ¶ 175.
[3]   Complaint, ¶ 4.
[4]   Complaint, ¶ 9 ("Valve has for years maintained its dominance and thwarted effective competition by engaging in various anticompetitive acts. For example, Valve forces game publishers to agree to a Platform Most-Favored-Nations Clause (the 'Valve PMFN') as a requirement to access Steam").
[5]   Complaint, ¶ 25.

that Valve's alleged anticompetitive conduct "imposed, and threatens to continue to impose, a common antitrust injury" to proposed class members.[6]

12.   Plaintiffs define the proposed class and class period as "All persons or entities who, directly or through an agent, paid a commission to Valve in connection with the sale or use of a game on the Steam platform on or after January 28, 2017, and continuing through the present until the effects of its scheme are eliminated (the 'Class Period'), and where either (1) the person or entity was based in the United States and its territories or (2) the game was purchased or acquired by a United States-based consumer during the Class Period. Excluded from the Class are (a) Defendant, its parents, subsidiaries, affiliate entities, and employees, and (b) the Court and its personnel."[7]

1.3.   Assignment

13.   On February 8, 2023, Plaintiffs' economic expert Dr. Steven Schwartz submitted an expert report in which he opines that Valve possesses monopoly power in the alleged market for third-party digital PC video game distribution on platforms,[8] and that Valve maintains its monopoly through the enforcement of an alleged PMFN.[9] He opines that Valve charges supracompetitive prices to proposed class members,[10] and that all proposed class members are similarly situated such that all would be harmed by the alleged conduct.[11] He presents a "Platform Competition Model" ("PCM") that purports to show class-wide harm to proposed class members using class-wide evidence (Schwartz Report, Section 7.2),[12] a "yardstick approach" that he claims indicates, using common evidence, that Valve charges supracompetitive fees (Schwartz Report, Section 7.3),[13] and a damages model

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[6]   Complaint, ¶ 378.

[7]   Complaint, ¶ 375.

[8]   Class Certification Expert Report of Steven Schwartz, Ph.D., February 8, 2024 ("Schwartz Report"), ¶ 12 ("The relevant antitrust market for purposes of my analysis is a worldwide market for third-party digital PC game distribution via platforms ... Valve has monopoly power in the relevant market").

[9]   See Schwartz Report, ¶ 169 ("Valve requires publishers on Steam to abide by its PMFN Policy, which constrains publishers from pricing a game differently or providing different content across platforms ... This limits the ability of competing platforms to grow and be effective competitors to Steam.").

[10]   Schwartz Report, ¶ 12 ("Valve has monopoly power in the relevant market, evidenced by its high and sustained market share, high and sustained profitability, and Valve-imposed barriers to entry to the market through the PMFN Policy, all of which allow Valve to charge a supracompetitive rate to publishers.").

[11]   Schwartz Report, ¶ 12 ("Valve's exercise and maintenance of its monopoly power has harmed and continues to harm putative class members, i.e., the publishers listing their games on Steam.").

[12]   Schwartz Report, ¶ 245.

[13]   Schwartz Report, ¶¶ 282–283, 300–301.

that he claims allows him to calculate class-wide damages using a common methodology and evidence (Schwartz Report, Section 8).[14]

14.   I have been asked by counsel for Valve to analyze the economic validity of the claims made by Dr. Schwartz in his report with respect to his damages model, his Platform Competition Model, and his "yardstick approach." I have also been asked whether Dr. Schwartz's analyses are capable of establishing class-wide harm and estimating damages using common evidence. I have been asked to address the following specific questions:

- From an economics perspective, is Dr. Schwartz's damages analysis reliable? Does Dr. Schwartz's damages model establish that class-wide damages can be estimated through a common methodology and evidence?
- From an economics perspective, is Dr. Schwartz's analysis of platform competition reliable? Does Dr. Schwartz's PCM establish that class-wide harm can be proven using common methodology and evidence?
- From an economics perspective, is Dr. Schwartz's yardstick approach reliable? Does Dr. Schwartz's yardstick approach establish that class-wide harm can be proven using common methodology and evidence?

2.   Summary of Opinions

2.1.   Summary of opinions regarding Dr. Schwartz's damages model

15.   Dr. Schwartz claims that his damages model can estimate class-wide damages using a common methodology and common evidence. I find that his model does not do so, and that it cannot do so. Dr. Schwartz's damages analysis is unreliable, and he cannot estimate damages (if any) to proposed class members without individualized inquiry.

16.   Economists use models to understand how economic outcomes would change if some feature of an industry were different. Inherently, models must be simpler than the real world, but a reliable model must capture the main characteristics of the industry and the decisions that affect economic outcomes. A model that is overly simplified or that does

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[14]   Schwartz Report, ¶¶ 399–400, Figure 9.

not capture important economic relationships in the industry can produce misleading and unreliable results.

17.   Dr. Schwartz's model is fundamentally flawed because it does not reflect economic reality: it fails to account for critical economic characteristics of video game consumers, developers, publishers, distributors, and the alleged PMFN itself. Furthermore, any attempt to accurately and reliably estimate alleged damages to proposed class members would necessitate inquiry into the individualized circumstances of consumers, developers, publishers, and distributors, requiring data that Valve does not have and that are not available in this litigation.

18.   Plaintiffs allege that Valve enforces a policy—the alleged PMFN—where developers and publishers may not offer their games for lower prices or with different content on rival PC distribution platforms. In order to measure the damages that would result from such a claim if it were found to be true, Dr. Schwartz would need to put forward a model that captures the optimizing decisions of the three main participants in this market—consumers, publishers/developers, and two-sided distribution platforms—and then model how a PMFN clause would affect the outcomes in the market after these participants have made their optimal choices. He fails to do so.

19.   Dr. Schwartz has not put forward a damages model that meets these criteria. I am not aware of an "off the shelf" model that includes these critical strategic interactions between consumers, publishers, and platforms that can accommodate estimating damages to publishers resulting from an alleged PMFN. But the lack of a published paper that lays out a straightforward damages model does not absolve Dr. Schwartz from needing to incorporate these critical components of this complex industry into his analysis. Dr. Schwartz's simplistic, ill-fitting model is not a reliable methodology for estimating class-wide damages in a marketplace with diverse consumers, publishers, and developers, characterized by complex, two-sided distribution platforms like Steam and its competitors. There are four main reasons why.

20.   First, Dr. Schwartz's damages model needs to capture consumer choices and the differences between consumers in these choices. It does not. Consumers purchase PC games in many places including digital platforms, other digital stores, brick-and-mortar stores, publishers' websites, and through Steam or other key resellers. Each individual consumer chooses which games to purchase and where to purchase them given the

consumer's own preferences over game characteristics, game prices, and platform or store attributes. The wide variety of games purchased and prices paid demonstrates the substantial differences across consumer preferences.

21.   However, Dr. Schwartz's damages model does not include consumers' choices at all. The omission of consumer choices is fatal to his model for two reasons. First, platforms invest substantial resources to improve consumers' user experiences (one of the primary differentiating factors between platforms). Second, at its very core, the impact of a PMFN depends on consumer choice of which venue to purchase and play a game from. By ignoring differences in consumer behavior, Dr. Schwartz fails to model the economic behavior at the heart of Plaintiffs' theory of harm.

22.   Second, Dr. Schwartz's damages model needs to capture the individualized circumstances of publishers and developers. It does not. Publishers, and developers that self-publish (to which I will refer collectively as "publishers"), sell games in many places including digital platforms, other digital stores, brick-and-mortar stores, publishers' websites, and through Steam or other key resellers. Publishers will choose to enter the industry if they can make profits from doing so. Each individual publisher that enters the industry makes choices over which games to develop and publish, where to offer these games for sale, what prices to charge, and how to advertise their games.

23.   Again, Dr. Schwartz's damages model fails to model the choices of publishers that are critical for understanding the impact of a PMFN. Dr. Schwartz does not model how publishers set game prices on any distribution platform, much less across platforms. Yet this is the critical decision at issue when considering the impact of an alleged PMFN, which restricts the prices that a publisher is allowed to charge across platforms. Beyond this central point, a PMFN may also affect publishers' choices of which platforms to offer games on—and even which games to develop or publish in the first place. Accounting for these choices is critical to any sound damages estimate because they explicitly affect which publishers are constrained by an alleged PMFN and which are not (i.e., which publishers are able to adjust their prices and offerings to make the alleged PMFN moot). It is not possible to know which proposed class members are damaged (let alone by how much) without accounting for their individualized distribution and pricing decisions.

24.   Third, Dr. Schwartz's damages model needs to capture fundamental economic characteristics of Steam and rival distribution platforms. It does not. Video game

distribution platforms are "two sided": platforms serve as a meeting place for consumers on the one side, and publishers on the other. Each platform chooses its attributes that consumers value, such as appearance and ease of use, search quality, social features, user-generated reviews, customer support, refunds, and the ability to play games with others and find others to play with. The platform also chooses its attributes that publishers value, such as visibility for their games, marketing assistance, player use metrics, and features and tools for publishers to use in their games (e.g., enabling multiplayer "matchmaking," giving players the ability to create modifications that they and others can use in gameplay, building a game's community interest and loyalty). Some platform attributes are valuable to both publishers and consumers, such as innovative features like Steam keys, which allow publishers to sell Steam-enabled games in other venues and allow consumers to play the games on Steam. Further, platforms choose what fees to charge consumers for purchasing games on the platform, and publishers for selling games on the platform (although they may choose to charge platform fees to only one of the two groups).

25.   However, Dr. Schwartz's damages model ignores the two-sided nature of platforms and their role in connecting consumers and publishers. He only models a single platform's decision of what revenue shares to charge publishers in a "one sided" exchange. He does not model the decisions of publishers and consumers that affect both groups' valuations of the platform's quality. Nor does he model the impact of those valuations on the revenue shares that each platform charges. For example, he does not model that a platform valued more highly by consumers and publishers is also likely, everything else equal, to be able to charge higher revenue shares. A PMFN explicitly limits the relative prices publishers can charge across platforms, and the alleged damages in this case are the differences in revenue shares and publisher revenues that result from this allegedly anticompetitive action. In order to understand damages relative to a but-for world without the challenged conduct, Dr. Schwartz would need to have a damages model that predicts but-for revenue shares and platform quality of both Steam and rival platforms under an alleged PMFN and without one. His damages model does not include this.

26.   Finally, Dr. Schwartz's damages model needs to predict the impact of the alleged PMFN on economic outcomes. It does not. Since this is the alleged conduct at issue, any reasonable damages model needs to explicitly model how consumers', publishers', and platforms' reactions to a PMFN would affect economic outcomes such as prices (game

prices, platform revenue shares), quantities (consumer purchases, publisher sales), and welfare (consumer welfare, publisher profits).

27.   In contrast, Dr. Schwartz's damages model does not account for a PMFN at all. Instead, he assumes that a PMFN would impact market shares. Because his model is incapable of modeling the impact of a PMFN, Dr. Schwartz uses *publishers'* relative sales of their *own* games on Steam more than a decade ago to make assumptions about what *platforms'* market shares would be today absent a PMFN. Specifically, Dr. Schwartz calculates eight publishers' relative sales of their own games on Steam between January 2008 and December 2012, and assumes that each of these publishers would develop distribution platforms to compete with Steam selling games from many publishers. He then assumes that Steam's market share selling *many publishers'* games through 2022 would be the same as Valve's share of its *own* game sales on Steam during this historical window long ago. Similarly, he assumes that the platforms competing with Steam, as a group, would have the same combined market share selling *many publishers'* games through 2022 as the seven other publishers had selling their *own* games on Steam from 2008 through 2012. These assumptions are not supported by any empirical or theoretical evidence. They are also logically inconsistent because they base Valve's share of Dr. Schwartz's proposed third-party PC game distribution market on Valve's first-party game sales a decade earlier. A platform's success relies on the features it offers to consumers and developers as well as "network effects" that develop over time, not on how successful that developer was at selling its own games over 10 years ago.

28.   These omissions combine to mean that Dr. Schwartz has not provided a suitable model of either the challenged conduct or the industry that could provide a class-wide estimate of damages. Instead, he uses an unsuitable model of the industry together with an unsubstantiated assumption about the impact of a PMFN to calculate damages. His damages estimates rely entirely on assumptions that are not supported by any economic modeling framework.

29.   Furthermore, even if Dr. Schwartz's damages model accurately reflected important industry features—which, as I have explained, it does not—his model cannot demonstrate that all proposed class members are harmed using common evidence. To do so, he would need to model the optimal choices and decision-making of consumers, publishers/developers, and distribution platforms, which necessitates individualized inquiry into data on those choices. Having these data is even more important given the

interactions between these parties and the impact of the alleged PMFN on these interactions. Proving impact and damages would require extensive inquiries into publisher-by-publisher and game-by-game data. Dr. Schwartz's model assumes away this complexity. Four main examples serve to demonstrate the central role of these interactions and the inability of Dr. Schwartz's damages model to capture these forces in his damages estimate.

30.   First, the interaction between platforms and publishers is critical for understanding how effective revenue shares for publishers would change between the existing ("as-is") world and the hypothetical ("but-for") world without the alleged conduct. Dr. Schwartz ignores the existence of Steam keys, which are codes publishers can sell or distribute for marketing purposes that can be redeemed on Steam for a playable game. There is substantial variation across publishers in their request for, sale of, and redemption of Steam keys. However, Valve has no information on the volume of sales or the price these Steam keys sell for, and thus, the reduction in effective revenue share that publishers are able to gain through their use of Steam keys that Valve gives them for free. Further, how publishers use Steam keys to reduce their effective revenue shares would change absent an alleged PMFN. This change is an equilibrium outcome that results from the interactions of the full set of platforms and publishers. Thus, not only does Dr. Schwartz's model not incorporate these publisher-specific reductions in effective revenue shares—and therefore does not speak to how they would change in the but-for world—but he also cannot incorporate them using class-wide evidence because the information is not available and could be obtained only through countless individual investigations.

31.   Second, the interaction between consumers and publishers (as intermediated by platforms) determines the rate at which publishers "pass through" changes in Steam's revenue share to customers in the form of game price changes. This is an important input into Dr. Schwartz's model because it determines the extent to which changes in publisher revenue shares would be borne by publishers rather than consumers. Dr. Schwartz's own method for estimating pass-through shows that there is substantial variation in the pass-through rates across the small sample of 124 games for which he makes extreme assumptions in order to estimate pass-through. This variation is to be expected given the substantial differences in consumers, games, and publishers. By contrast, Dr. Schwartz assumes that the pass-through rate is the same for all games and publishers on Steam because he lacks the necessary data to determine game-specific or publisher-specific pass-through rates for all proposed class members. The degree of pass-through is

quantitatively important for damages, and understanding it for each game and publisher would require individualized inquiry.

32.   Third, the interaction between publishers and developers is also critical for determining damages. Dr. Schwartz's model assumes that any change in publisher revenues from the removal of the alleged PMFN (net of pass-through to consumers and publishing costs) constitutes the damages the publisher bears. However, individualized contracts between publishers and their (possibly many) developers will vary the degree to which each party is harmed. Not only does Dr. Schwartz not model these individualized agreements, but again, I am aware of no common evidence available on these interactions. The evidence resides in specific contracts with unknown terms between an unknown number of publishers and developers. Therefore, understanding the impact of the alleged PMFN on a publisher or developer would require extensive individualized inquiry.

33.   Finally, the importance of platforms in providing a meeting place for consumers and publishers makes the interaction between all three of these parties critical to understanding damages. By modeling the industry as "one sided," Dr. Schwartz ignores the reality that the value of platforms comes from building and maintaining a base of consumers and publishers. These "network effects" mean that a consumer is more likely to use a platform that has a large number of publishers and other consumers, and a publisher is more likely to offer its games on a platform with a large number of consumers and other publishers. As a result, by basing platforms' but-for market shares on publisher sales and ignoring documented network effects in the industry, Dr. Schwartz is unlikely to correctly predict but-for market shares for Steam or its competitors. Network effects are important to distribution platforms, yet they are not necessarily important to a publisher's portfolio of games. Dr. Schwartz has provided neither a model nor empirical evidence to support his assumption that publisher market shares in selling their own games are a good proxy for platform market shares.

34.   In sum, Dr. Schwartz's damages model is incapable of estimating damages for proposed class members with common proof. His model must capture the optimizing decisions of the main participants in this market and predict how a PMFN clause would affect the outcomes in that market. It does not. His contrary-to-fact assumptions—ignoring the two-sidedness of the market, variation in pass-through, Steam key use, and publisher and consumer platform choice, among others—yield contrary-to-intuition predictions. Dr.

Schwartz's model requires data from individualized inquiries, which in many cases do not exist.

2.2.   Summary of opinions regarding Dr. Schwartz's Platform Competition Model

35.   In support of Plaintiffs' proposed class certification motion, Dr. Schwartz claims that his PCM can establish class-wide harm using a common methodology and common evidence. I find that his model does not do so, and that it cannot do so.

36.   As explained in the above discussion of Dr. Schwartz's damages model, for a model to reliably establish antitrust impact or harm, it must accurately reflect important industry characteristics in the as-is world, as well as capture how these conditions would change in the but-for world without the challenged conduct.

37.   Dr. Schwartz has not put forward such a model. Instead, Dr. Schwartz uses a stylized theoretical model from the literature that was intended for a different purpose, makes assumptions and assigns values to the model inputs that are contrary to the facts observed in reality, and derives predictions from the model that do not accurately describe the as-is world. Dr. Schwartz then assumes that differences between this mis-specified as-is world and a predicted but-for world prove class-wide impact. I show that this inappropriate approach is unreliable, unconnected to the industry realities, and insufficient to show class-wide antitrust impact (or damages).[15]

38.   Dr. Schwartz's PCM relies on a stylized theoretical model proposed by Andre Boik and Kenneth S. Corts in a 2016 paper.[16] The intent of this model is to understand theoretically the effects of a PMFN policy that requires publishers to charge the same price for their product on all platforms.[17] This was never intended to be a model that is taken directly to

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[15]   I understand that Dr. Schwartz does not put forward his PCM as a common methodology for calculating class-wide damages; however, my critiques of Dr. Schwartz's PCM model presented in this report hold irrespective of whether one attempts to use the PCM to show antitrust injury or damages.

[16]   Andre Boik and Kenneth S. Corts, "The Effects of Platform Most-Favored-Nation Clauses on Competition and Entry," *The Journal of Law and Economics*, 59(1), 2016, pp. 105–134 ("Boik and Corts (2016)"). Throughout my report, when discussing "Boik and Corts" I am referring to the model and analysis contained in Boik and Corts (2016).

[17]   Dr. Schwartz and Boik and Corts refer to "sellers" that use a platform to sell their games and the associated "commission rate" or "fees" charged to sellers by platforms. Throughout my report, I refer to these "sellers" as "publishers" and the associated "commission rate" or "fees" they are charged by platforms as a "revenue share." Additionally, my use of "publishers" in this context includes both "publishers" as I define them below in Section 3, as well as "developers" that self-publish their games on platforms. See, e.g., Schwartz Report, ¶¶ 334, 394, 401; Boik and Corts (2016).

data to empirically demonstrate the effect of a PMFN on platform entry. Rather, the goal of this stylized theoretical model is to demonstrate the economic forces at work when generic platforms choose whether to have PMFNs. To accomplish this, Boik and Corts write down a model of platform competition that drastically simplifies the real world. In their model there are only two platforms, one publisher, one product, no network effects, no customer pricing or discounts, and no strategies that take time for the platforms or the publisher to implement. This extremely simple model is sufficient for Boik and Corts to show that a PMFN could either increase or decrease platform entry depending upon the characteristics of the industry. The model does not take a stand on the effect of a PMFN on the publisher's profits.

39.   Even before turning to Dr. Schwartz's attempts to tie the Boik and Corts model to the video game industry, it is critical to recognize that the Boik and Corts model is inappropriate and insufficient to demonstrate that all publishers and competing platforms have been harmed in the real world. This is because the model was never designed to demonstrate the impact of a PMFN on the differentiated publishers and platforms that characterize the video game industry in reality. In particular, the model departs from economic reality in at least two foundational ways that render it incapable of establishing harm in this matter.

40.   First, Boik and Corts explicitly assume—and Dr. Schwartz adopts the assumption—that there is only a *single* seller (e.g., a publisher or developer in the video game industry) that sells a *single* game. Therefore, differences across publishers, their games, their customer bases, their competitive strategies, and their responses to PMFN clauses are not, and cannot, be accurately captured in Dr. Schwartz's PCM. The impact of a PMFN on multiple publishers' economic outcomes *cannot* flow from this model.

41.   Second, the Boik and Corts model includes *only two platforms*, one of which is assumed to be the incumbent platform. Dr. Schwartz adopts this assumption, and further assumes that the incumbent only differs from the potential entrant platform in a fixed and persistent way.[18] Thus, the model is not designed to understand—and therefore *cannot* demonstrate—how a PMFN will affect differentiated platforms that vary on multiple dimensions and that compete strategically with each other, as well as with the incumbent

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[18]   Specifically, Dr. Schwartz assumes that the potential entrant faces a "demand disadvantage" that is captured by parameter "x" in his PCM. Schwartz Report, ¶¶ 265–266. And, more importantly, he assumes that this "demand disadvantage" of the entrant platform is large, fixed, and would remain persistent after its entry.

platform. The fact that Dr. Schwartz uses this ill-equipped model to support his claim of class-wide harm demonstrates how Dr. Schwartz assumes his conclusion, rather than allowing a well-specified economic model to demonstrate his result.

42.   Ignoring the unsuitability of the Boik and Corts model to the task at hand, Dr. Schwartz claims that he can make assumptions about the values of the parameters in parts of the model and then infer the value of the remaining parameters to describe the as-is world. Temporarily putting aside the details of his approach, the as-is world that Dr. Schwartz claims his PCM describes bears only passing resemblance to the video game industry. In Dr. Schwartz's representation of the as-is world, publishers earn *negative profits* when selling through Steam and have marginal costs (before platform revenue shares) of 75 percent of their sales prices. Yet, in reality, evidence shows that publishers successfully earn substantial profits on Steam over many years, and that this is an industry with known low marginal costs of bringing video games to market. These unrealistic outcomes of the model in the as-is world indicate that the model is ill-suited to describe the video game industry.

43.   Because of these fundamental mismatches between Dr. Schwartz's adaptation of the Boik and Corts model for his PCM and the video game industry, not only does Dr. Schwartz's PCM fail at reliably predicting the as-is world, but it is also ill-suited to predict what would happen in the but-for world. Two main examples stand out.

44.   First, the lack of network effects in the Boik and Corts model and its adaptation by Dr. Schwartz means that the new platform entrant is prevented from growing and catching up with the incumbent over time in terms of the number of games sold. In addition, the model does not allow for platform strategies to develop over time, and it lacks consumer incentives. Taking all these assumptions together, this means that the entrant cannot use growth strategies commonly seen in this industry (e.g., specializing in certain kinds of games, paying publishers to sell their games only on a given platform, offering free games, offering specific features) to bring new consumers to the platform. As such, market outcomes—and the impact of a PMFN on these market outcomes—are different in the Boik and Corts model than they would be in the presence of network effects or dynamic strategies. In the absence of network effects, to reconcile the difference between the incumbent's and entrant's market shares, Dr. Schwartz must assume that the entrant platform, which he assumes to be Epic Games Store ("EGS"), faces a large, fixed, and persistent "demand disadvantage." In fact, this assumption effectively drives Dr.

Schwartz's result that an alleged Steam PMFN substantially impacts EGS profits. One of the main takeaways from the Boik and Corts paper is that the value of important parameters (in particular the value of the "demand disadvantage" parameter) will substantially affect the impact of a PMFN on the industry. By assuming unrealistic values for these core parameters and using them to infer the values of other parameters, Dr. Schwartz is again assuming his result rather than letting it be the outcome of an appropriately specified economic model.

45.   A second example is the assumption in Boik and Corts, also adopted by Dr. Schwartz, that there is only a single publisher selling a single game to players who, beyond price and the entrant's "demand disadvantage," do not care about any characteristics of the games they buy or the platforms on which they play them. This is an extreme simplification of the video game industry, which is in reality characterized by important differences across publishers, their games, and their customers and platforms. By assuming away the complexity of the industry, Dr. Schwartz's model cannot be relied upon as a common method designed to demonstrate class-wide harm. To establish harm to each proposed class member, he would need to account for the differences across publishers; this would require individualized inquiry into each publisher in the industry, their games, their consumers, and the platforms via which they do business. However, even if Dr. Schwartz were to run his PCM one-by-one separately for each publisher, which he cannot do with the data available in the case, he would still fail to establish common harm for all proposed class members. This is because his PCM fails to account for the competitive dynamics between these publishers and their games, or for the fact that multiple games are owned by the same publisher.

46.   In sum, Dr. Schwartz's PCM is divorced from economic reality and is not able to approximate basic facts of the video game industry observed in the real world; therefore, it cannot reliably predict market outcomes in the but-for world. His PCM cannot be used to establish how the alleged PMFN impacted entry, or the extent to which the alleged PMFN could have harmed proposed class members (if at all). The fact that Dr. Schwartz's model generates unreliable predictions that do not make economic sense is a consequence of his decision to (i) use a model that was not intended for this purpose; and (ii) make unfounded assumptions that do not match the fundamentals of the video game industry.

2.3. Summary of opinions regarding Dr. Schwartz's "yardstick approach"

47. The reliability of the yardstick approach, where a subject firm is compared to one or more benchmark or "yardstick" firms, hinges upon the closeness of the subject firm and its comparison group. The benchmark firms provided by Dr. Schwartz are an inappropriate comparison group. Because the services provided by Dr. Schwartz's benchmark firms do not resemble Steam's, there is no reason to believe that Dr. Schwartz's yardstick approach provides any evidence regarding the revenue share that Valve might have charged in the but-for world. As a result, Dr. Schwartz has not established class-wide harm through a common methodology in this case. In fact, the most obvious yardstick comparison—console distribution platforms, one he does not use—would indicate that Valve's revenue share is not elevated but competitive.

3. Background

48. Video games are an interactive entertainment medium where a user—that is, a player or a gamer—makes choices to control images on a screen. Video games have grown in complexity and market presence over time.[19] For example, 1970's *Pong* involved a player moving a simple bar to deflect a digital ball from crossing a goal line on a black-and-white screen.[20] Today, video games exhibit rich graphics, can involve whole worlds with their own lore, and can be played with other gamers across the world. ███████████████ ██.[21]

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[19] Edward Goh, Omar Al-Tabbaa, and Zaheer Khan, "Unravelling the Complexity of the Video Game Industry: An Integrative Framework and Future Research Directions," *Telematics and Informatics Reports*, 12, 2023, pp. 1–18 at p. 1 ("However, due to its rapidly evolving nature, the [video game industry] has drastically transformed, in various ways, since its growth in the late 1990s and early 2000s due to the rise of emerging technologies...It has become so significant that nearly 40% of the global population spends at least some of their leisure time gaming.").

[20] Kyle MacNeill, "'No One Had Seen Anything Like It': How Video Game Pong Changed The World," *The Guardian*, November 25, 2022, available at https://www.theguardian.com/games/2022/nov/25/history-pong-video-game-atari-nolan-bushnell-al-alcorn, accessed on May 5, 2024 ("The game – a 2D version of table tennis where players control a rectangle 'paddle', moving it up and down to rally a ball...").

[21] ██ █████████████████████████████████████ International Federation of the Phonographic Industry, "Global Music Report 2024: State of the Industry," available at https://www.ifpi.org/wp-content/uploads/2024/04/GMR_2024_State_of_the_Industry.pdf, accessed on May 5, 2024, p. 10 ("[T]he global recorded music market was worth US$28.6 billion in 2023."); Statista reports the size of the cinema market as $72.31 billion in 2023. See Statista, "Cinema," available at https://www.statista.com/outlook/amo/media/cinema/worldwide#revenue, accessed on May 6, 2024.

49.   Current industry participants can generally be broken down into four groups: end users (consumers), developers, publishers, and distributors (which include both physical and digital distributors).[22]

50.   **Consumers:** Consumers are end users who purchase and play video games. Consumers have varying preferences for the types of games that they play, which creates the demand in the market for firms to craft different types of games. Gamers differ in their willingness to pay for certain games or game features, and in the benefits they may derive from certain platform features.[23] For example, some gamers prefer story-driven role-playing games and will log dozens of hours following the story of monster-slayer Geralt in *The Witcher*.[24] Others will spend 10 minutes planting crops and maintaining their digital farm in *Stardew Valley* after a stressful day at work.[25] And still others will spend hundreds of hours socializing with their friends playing ranked matches in the battle arena game

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[22]   See Jennifer Mendez, "Are Distributors the New Publishers," *Game Developer*, July 27, 2017, available at https://www.gamedeveloper.com/business/are-distributors-the-new-publishers-, accessed on May 6, 2024. As I explain below, some firms can play multiple roles. For example, some developers also publish their own games, and some publishers have their own distribution platforms. Epic Games is a developer and publisher that created EGS.

[23]   In a similar context, an academic article by Robin Lee explicitly models consumers having heterogenous preferences for features provided by video game consoles. See Robin S. Lee, "Vertical Integration and Exclusivity in Platform and Two-Sided Markets," *American Economic Review*, 103(7), 2013, pp. 2960–3000 at p. 2970 ("...[A]re coefficients that reflect how intensely consumer i prefers console characteristics, prices for hardware and software, and software in general..."). See also Carmelo Cennamo and Juan Santalo, "Platform Competition: Strategic Trade-Offs in Platform Markets," *Strategic Management Journal*, 34(11), 2013, pp. 1331–1350 at p. 1346 ("Distinctive features of the video game industry include the heterogeneity of consumer preferences for the type of games (i.e., gaming genre), the variety of novel games available in dedicated niches and their quality, which might induce users with different tastes to cluster around separate market niches.").

[24]   In role-playing games, players lead a character, make choices for the character, and engage in diverse adventures. Geralt is a witcher, a fictional character, and the main protagonist of the *Witcher* series, based on a series of novels by Andrzej Sapkowski. In this fantasy world, witchers are traveling hunters whose main role is to protect people from dangerous mythological monsters. The *Witcher* series was developed by CD Projekt Red and published by CD Projekt. See CD Projekt, "The Witcher," available at https://www.thewitcher.com/us/en, accessed on May 6, 2024.

[25]   *Stardew Valley* is a farming simulation game. Players take the role of a character who inherits a rundown farm, and they spend time restoring the farm, growing crops, and exploring the farm's environs. *Stardew Valley* was developed and published by ConcernedApe. See Stardew Valley, "Stardew Valley," available at https://www.stardewvalley.net/, accessed on May 6, 2024.

Dota 2.[26] Consumers engage with video games using different hardware, including PCs, consoles, mobile phones, and tablets.[27]

51.   **Developers:** Developers are individuals or teams of individuals who write the code, craft the stories, and design the gameplay that results in video games. Developers create different types of video games. Some video games differ by the type of gameplay and/or genre—single-player, multiplayer, role-playing games, shooters, horror, action, and other sometimes overlapping types and genres—and others differ by features or complexity.[28] The scale and budget of a developer team can be small (sometimes referred to as "indie" developers) or large (sometimes referred to as "AAA" developers).[29] Developers compete

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[26]   *Dota 2* is a multiplayer online battle arena, wherein two teams of five players compete against one another. As a multiplayer game, *Dota 2* allows players to form premade teams with their friends or be matched up with other players online. *Dota 2* also has a professional "esports" league with an annual world championship prize pool over one million dollars. *Dota 2* was developed and published by Valve. See Dota 2, "Dota 2," available at https://www.dota2.com/home, accessed on May 6, 2024.

[27]   Entertainment Software Association, "2023 Essential Facts About the U.S. Video Game Industry," July 10, 2023,   available   at   https://www.theesa.com/wp-content/uploads/2023/07/ESA_2023_Essential_Facts_FINAL_07092023.pdf, accessed on May 6, 2024 ("Devices Used To Play Video Games: 64% Mobile, 54% Console, 45% PC/Laptop, 24% Tablet, 10% VR Headset.").

[28]   Dwight Pavlovic, "Video Game Genres: Everything You Need to Know," *HP*, July 23, 2020, available at https://www.hp.com/us-en/shop/tech-takes/video-game-genres, accessed on May 6, 2024 ("In our game genres list, we'll cover 10 of the most relevant video game categories today. 1. Sandbox, 2. Real-time strategy (RTS), 3. Shooters (FPS and TPS), 4. Multiplayer online battle arena (MOBA), 5. Role-playing (RPG, ARPG, and More), 6. Simulation and sports, 7. Puzzlers and party games, 8. Action-adventure, 9. Survival and horror, 10. Platformer. Keep in mind that many genres have some degree of overlap with each other."); Lauren Morton, "6 Game Genre Trends That We Think are Going to Define 2024," *PC Gamer*, December 25, 2023, available at https://www.pcgamer.com/6-game-genre-trends-that-are-going-to-define-2024, accessed on May 10, 2024 ("If there's one thing it's nigh impossible to predict in gaming, it's the trajectory of the major and minor genres. New genres emerge or assert themselves every year (Vampire Survivors-alike, co-op horror), and dormant ones stage dramatic comebacks. We're lucky to belong to a hobby that's this unpredictable, frankly.").

[29]   Laura Parker, "The Rise of the Indie Developer," *Game Spot,* February 17, 2011, available at https://www.gamespot.com/articles/the-rise-of-the-indie-developer/1100-6298425, accessed on May 6, 2024 ("Minecraft, Super Meat Boy, Braid, and Limbo are examples of successful indie titles created by individuals or small teams that have managed to capture the attention of both the indie and mainstream space while retaining their creators' original vision."); Brittany Alva, "What Makes a AAA Game a AAA game?" *Epic Games Store*, October 10, 2023, available at https://store.epicgames.com/en-US/news/what-makes-a-aaa-game-a-aaa-game, accessed on May 6, 2024 ("Omdia Senior Games Analyst James McWhirter explained that AAA games cost the most to develop and market, likening them to blockbusters... [o]nly studios like Activision Blizzard, Ubisoft, Square Enix, and Warner Bros. Games can afford to develop and market games of this scale.").

with one another to develop games that will appeal to consumers.[30] Named Plaintiffs Wolfire Games and Dark Catt are developers.[31]

52. **Publishers:** Video game publishers have contractual marketing and distribution relationships that help bring games from developers to consumers.[32] Publishers differ in terms of size and organizational structure,[33] and publishers vary in how they choose to monetize their games (e.g., through game sales, in-game purchases, or both).[34] Publishers set consumer prices on Steam.[35] Publishers differ in their pricing strategies, and in their use of different distributors.[36]

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[30]   Economists use the term "product differentiation" to describe the basic fact that products are different in the video game industry in a way that matters to consumers. In an industry with product differentiation such as video games, developers choose not only the price of the game, but also its characteristics. See B. Douglas Bernheim and Michael Whinston, *Microeconomics*, (McGraw-Hill/Irwin, 2008), p. 737 ("But in markets with product differentiation, we must consider a new factor: firms must decide what kind of product to produce... firms will often try to differentiate their products from those of other firms in order to avoid intense price competition.").

[31]   Complaint, ¶¶ 27–29 ("Plaintiff Wolfire Games, LLC ('Wolfire Games') is a video game publisher headquartered in San Francisco, California.... Plaintiff Dark Catt Studios Holdings, Inc. ('DCS Holdings') is a multimedia production company and development studio with a focus on film, animation, and narrative media forms.... Plaintiff Dark Catt Studios Interactive LLC ('DCS Interactive') is a wholly owned subsidiary of DCS Holdings and specializes in PC software, gaming, interactive content, and experiences."); Steam, "Wolfire Games," available at https://store.steampowered.com/developer/wolfire, accessed on May 8, 2024 ("At Wolfire, we create innovative and experimental games, and share the lessons we learn to help make game development accessible to everyone.").

[32]   Thomas Zegarra, "Game Developers vs Game Publishers: What's the Difference?" *HP*, July 19, 2020, available at https://www.hp.com/us-en/shop/tech-takes/game-developers-vs-game-publishers, accessed on May 6, 2024 ("Game publishers are larger companies or in some cases, the parent organization, that has the resources to put the finished game on the market for the world to play.... This includes working with in-person retailers and online stores to ensure your product is visible to the gaming community.... When a contract exists between a developer and publisher, they lay out who is in control of their product. The situation is difficult to navigate from the outside, but the game industry partners use the contract to clearly differentiate and delineate who does what during the creation of the game.").

[33]   For example, Electronic Arts reported $7 billion in net revenue in 2022, while Devolver Digital reported $135 million. See Electronic Arts, "Electronic Arts Reports Q4 and FY23 Results," May 9, 2023, available at https://ir.ea.com/press-releases/press-release-details/2023/Electronic-Arts-Reports-Q4-and-FY23-Results/default.aspx, accessed on May 6, 2024; Devolver Digital, "Annual Report and Consolidated Financial Statements for the Year Ended 31 December 2022," May 3, 2023, available at https://investors.devolverdigital.com/files/downloads-and-publications/DevolverDigital-Annual-Report-2022.pdf, accessed on May 6, 2024.

[34]   See Playwire, "6 Game Monetization Models," available at https://www.playwire.com/blog/6-game-monetization-models, accessed on May 6, 2024 ("There are multiple ways to monetize a mobile app, desktop app, or web-based game, including in-game purchases, premium paid downloads, in-game advertising, ongoing subscriptions, and sponsorships.").

[35]   Steamworks, "Pricing," available at https://partner.steamgames.com/doc/store/pricing, accessed on May 6, 2024 ("Developers on Steam have control over their own prices, in every currency.").

[36]   Rebekah Valentine, "Pay More to Play: Why Video Game Prices Could Rise in 2023," *IGN*, January 5, 2023, available at https://www.ign.com/articles/pay-more-to-play-why-video-game-prices-could-rise-in-2023, accessed on May 6, 2024 ("In the last year, Ubisoft, Take-Two, Xbox, and Sony all formally announced a bump in game prices from $60 to $70, and other AAA publishers such as Activision Blizzard, EA, Square Enix, and Warner Bros. have quietly followed suit.... Meanwhile, games increasingly get deep discounts within a year of launch.... Nintendo is the one

53.   With the advent of online distribution platforms and increased access to self-publishing, some developers no longer rely as strongly on publishers to bring their games to consumers.[37] Some developers bypass publishers altogether and sell their games through distributors, or directly to consumers on their own websites or platforms. In addition, some publishers are also video game developers. Throughout this report, I refer to any entity—a developer, an individual, or a publishing company—that lists a video game for sale on a digital distribution platform as a "publisher."

54.   **Distributors:** Distributors provide a way for publishers to advertise and sell their games to consumers. They include physical distributors (retailers) and digital distribution platforms. Physical retailers (such as GameStop) sell and distribute physical media such as discs and cartridges and earn profits through markups. They also sell codes that consumers can redeem on a platform to access a digital copy of a game. A game box at a physical store could contain either physical media or a printed code.[38] Digital distribution platforms (such as Steam) are websites or software applications through which end users buy and/or play video games over the internet. Digital distribution platforms can sell both first-party games (i.e., the same company that runs the platform also develops and publishes its games, such as Valve, which runs the platform Steam and publishes the game *Portal*) and third-party games (i.e., the distribution platform sells titles that it does not

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major exception – but notably, its games are still $60...for now.... The good news in all this is that not every game is going to be $70, in the same way that not every game now is $60. All major publishers release a number of their non-blockbuster games each year for lower price points, or using alternative business models like free-to-play, subscription services, and the like."); Jennifer Mendez, "Are Distributors the New Publishers?" *Game Developer*, July 27, 2017, available at https://www.gamedeveloper.com/business/are-distributors-the-new-publishers-, accessed on May 6, 2024 ("Distribution platforms are available to anyone, developer or publisher, and can be used as a tool.").

[37]   Jules Herd and Forbes Agency Council, "The Global Surge of Independent Games Development Studios," *Forbes*, August 21, 2023, available at https://www.forbes.com/sites/forbesagencycouncil/2023/08/21/the-global-surge-of-independent-games-development-studios/?sh=fddf28d2a502, accessed on May 6, 2024 ("The creation of digital distribution platforms has revolutionized the indie game development landscape. With a global reach and exposure to millions of gamers worldwide, these platforms have become game changers. By eliminating the need for costly physical distribution, smaller studios can now compete on a level playing field with larger game publishers.").

[38]   It is increasingly common for physical video game discs or cards to contain validation information to download a digital game from the internet rather than containing the game's actual data. See Derek Garcia, "You're Not Buying Video Games, You're Buying IOUs," *ScreenRant*, November 13, 2022, available at https://screenrant.com/video-game-physical-disc-validation-key-digital-download/, accessed on May 6, 2024 ("Although video games have clearly evolved into a digital medium there remains a segment of consumers who still purchase physical discs, but more accurate language is needed for these products, as they are typically 'validation discs,' not true 'game discs' in the traditional sense.... Unlike the earlier generations of consoles where a game's data was entirely housed in a physical cartridge or disc, modern games are downloaded through the internet to a console's hard drive.").

develop or publish).[39] For third-party games, digital distribution platforms generally earn profits through charging a share of all revenues earned on sales.[40]

55.   Distributors vary in the features that they provide to publishers, developers, and consumers. For example, while digital distributors lack salespeople who can help customers find games, they may provide sophisticated visibility and search features, user reviews, automatic patches, and the ease of purchasing from home.[41] For developers and publishers, digital distributors may provide automatic currency conversions, integrated beta testing and early release capabilities, metrics on consumer purchases, and other valuable features.[42] Distributors compete with one another by offering different features and by charging different revenue shares for sales in their stores or on their platforms.[43]

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[39]   For example, EGS launched on December 6, 2018 as a platform for both first-party games, like *Fortnite*, and third-party games, like *Ashen*, which was developed by A44 and published by Annapurna Interactive. See Epic Games, "The Epic Games Store is Now Live," December 6, 2018, available at https://store.epicgames.com/en-US/news/the-epic-games-store-is-now-live, accessed on May 6, 2024 ("The Epic Games store is now open, featuring awesome high-quality games from other developers."); Epic Games Store, "Fortnite," available at https://store.epicgames.com/en-US/p/fortnite, accessed on May 6, 2024; Epic Games Store, "Ashen," available at https://store.epicgames.com/en-US/p/ashen, accessed on May 6, 2024.

[40]   Ian Carlos Campbell and Julia Alexander, "A Guide to Platform Fees," *The Verge*, August 24, 2021, available at https://www.theverge.com/21445923/platform-fees-apps-games-business-marketplace-apple-google, accessed on May 6, 2024 ("Online marketplaces like Etsy and Apple's App Store allow businesses to flourish by connecting them to huge, global audiences. But these marketplaces are big businesses themselves, and in order to earn a profit, they take a cut of revenue from many of the other companies that use their space."); Deloitte, "Fees Applied by Distribution Platforms to Transactions by Developers and Content Providers," September 14, 2023, available at https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/fusions-acquisitions/Publications/deloitte_etude-distribution-platforms.pdf, accessed on May 10, 2024 ("Services fees are common across all the platforms studied, reflecting this as a common business model for distribution platforms. They vary from 5% to 80% of developer and/or content provider revenues. Specific levels depend on different factors, such as the content type, developer's revenues, exclusivity of the content, the use of developer's own or third-party billing/payment systems and the developer's monetization strategy. Most platforms included in our benchmark (13 out of 19) apply a 30% service fee.").

[41]   Robin Valentine, "PC Gaming's Many Launchers, Reviewed for 2024: Steam Still Puts the Rest to Shame," *PC Gamer*, January 30, 2024, available at https://www.pcgamer.com/pc-gamings-many-launchers-reviewed-for-2024-steam-still-puts-the-rest-to-shame/, accessed on May 6, 2024.

[42]   Deloitte, "Fees Applied by Distribution Platforms to Transactions by Developers and Content Providers," September 14, 2023, available at https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/fusions-acquisitions/Publications/deloitte_etude-distribution-platforms.pdf, accessed on May 10, 2024 ("It is also important to recognize that platforms may make different investments and offer different types and levels of service to which distribution fees are intended to contribute. Platforms usually offer at least some of the following services to developers and end-users: security, development/performance/marketing tools, technical support and billing/payment systems.").

[43]   As an example from the academic literature, an article by Zhu and Iansiti focuses on quality (feature) competition in the video game console context while also acknowledging that price (revenue share) competition can be important. See Feng Zhu and Marco Iansiti, "Entry into Platform-Based Markets," *Strategic Management Journal*, 33(1), 2012, pp. 88–106 at p. 90 ("We assume that in each period, the two platforms are priced at the same level. While platform providers could strategically use prices to differentiate their platforms, this assumption allows us to focus on the interactions of indirect network effects, platform quality, and consumer expectations."). As Dr. Schwartz also acknowledges, video game distribution platforms charge different revenue shares. For example, Steam charges

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3.1. Valve and Steam

56. Valve originated as a game developer and later launched its digital platform, Steam, in 2003, first with just its own games.[44] In 2005, Valve also began distributing third-party games on Steam.[45]

57. Steam is regarded as feature-rich compared to rival digital distribution platforms.[46] For example, in addition to social and personalization features, Steam has a "Wishlist" feature where users can be notified when a game they are interested in goes on sale.[47] On the developer and publisher side, Steam offers tools that support user-generated content, multiplayer "matchmaking," in-game purchases, achievements, and more.[48] In this way,

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a headline revenue share of 30 percent, whereas EGS charges a headline revenue share of 12 percent. See Schwartz Report, ¶ 303 ("Specifically, Epic charges developers and publishers a commission rate of 12%, compared to Valve's 30%."). PC distribution platforms specifically compete through games and features they offer, such as Steam's free Steam keys. See, e.g., Robin Valentine, "PC Gaming's Many Launchers, Reviewed for 2024: Steam Still Puts the Rest to Shame," *PC Gamer*, January 30, 2024, available at https://www.pcgamer.com/pc-gamings-many-launchers-reviewed-for-2024-steam-still-puts-the-rest-to-shame, accessed on May 6, 2024 ("The biggest and still the best, Steam offers both the widest range of games and the best suite of features of any of the available launchers. Customisable tags and folders let you keep your collection organised and easily browsable; your wishlist is easily managed and automatically lets you know about the best discounts; and full social hubs for every game let players share opinions, guides, screenshots, and more. ... Steam is easily the most beloved launcher in the business, and that devotion is well-earned."); Steamworks, "Features," available at https://partner.steamgames.com/doc/features, accessed on May 6, 2024.

[44]   Tyler Wilde and Matt Sayer, "The 19-Year Evolution of Steam," *PC Gamer*, September 12, 2022, available at https://www.pcgamer.com/steam-versions/, accessed on May 6, 2024 ("2003: The beginning. On September 12, Steam began life as a way for Valve to control the patching process for games like Counter-Strike, as well as curb cheating and provide easier access to any content the developer produced...The only games mentioned are Valve's own, and there is no way to purchase them from the site.").

[45]   Tyler Wilde and Matt Sayer, "The 19-Year Evolution of Steam," *PC Gamer*, September 12, 2022, available at https://www.pcgamer.com/steam-versions/, accessed on May 6, 2024 ("In 2005, Ragdoll Kung Fu and Darwinia become the first non-Valve games to hit Steam.").

[46]   Robin Valentine, "PC Gaming's Many Launchers, Reviewed for 2024: Steam Still Puts the Rest to Shame," *PC Gamer*, January 30, 2024, available at https://www.pcgamer.com/pc-gamings-many-launchers-reviewed-for-2024-steam-still-puts-the-rest-to-shame/, accessed on May 6, 2024 ("The biggest and still the best, Steam offers both the widest range of games and the best suite of features of any of the available launchers.").

[47]   Corbin Davenport, "10 Steam Features You Should Be Using," *How-To Geek*, March 20, 2023, available at https://www.howtogeek.com/828586/10-steam-features-you-should-be-using/, accessed on May 6, 2024 ("You might already know that Steam has a Wishlist feature, which contains games you saved for purchasing (or looking at) later. It's more than just a simple list, though. If you add an unreleased game to your Wishlist, Steam will send you a notification (and an email) when the game is available to purchase. Steam will also notify you in the same way if a game on your Wishlist ever goes on sale. Finally, depending on your profile privacy setting, your Steam friends can see games on your Wishlist. That makes gift-giving for birthdays, holidays, or other special occasions much easier -- assuming your Steam friends coordinate the gifts, anyway.").

[48]   Steam supports user-generated content and modifications (or "mods") through its Steam Workshop. Matchmaking is a process by which users are automatically matched up with other players rather than having to invite specific users to a multiplayer game. Achievements are in-game rewards or markers of progress, which players use to track their progress or compare themselves to other players. See Steamworks, "Features," available at https://partner.steamgames.com/doc/features, accessed on May 6, 2024.

Steam continues to provide services to consumers even after the completion of a transaction.

58.   One feature that Steam provides to publishers and developers for free is Steam keys. Steam keys are digital codes that allow users to download and play a game on Steam just as if they had bought the game on Steam.[49] On the publisher side of the platform, publishers and developers can ask Valve to issue Steam keys to use internally for testing the game, to provide to reviewers and influencers free copies for marketing purposes, or to sell their game on non-Steam locations for play on Steam.[50] On the consumer side of the platform, consumers can buy Steam keys at stores (physical or online) if publishers have obtained Steam keys from Valve and decided to sell them there, and can redeem the keys on the Steam platform for a copy of the game. Once redeemed, a Steam key game works equivalently to a game purchased directly on Steam.[51] Publishers do not pay Valve for Steam keys Valve issues to them, whether through revenue share or in any other way.[52]

59.   Steam—along with many of its competitors—has a headline revenue share rate of 30 percent. This means that for games consumers purchase on Steam, Valve pays 70 percent of net revenue to the publisher.[53] In 2018, Steam introduced a tiered revenue share where publishers' games with more than $10 million in Steam sales qualify for an additional revenue share, increasing the publisher's rate to 75 percent for each dollar of sales above that threshold, with a further increase to 80 percent for each dollar of sales

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[49]   Steamworks, "Steam Keys," available at https://partner.steamgames.com/doc/features/keys, accessed on May 2, 2024 ("Steam Keys are single-use, unique, alphanumeric codes that customers can activate on Steam to add a product license to their account. Steam Keys are a free service we provide to developers as a convenient tool to help you sell your game on other stores and at retail, or provide for free for beta testers or press/influencers.").

[50]   Steamworks, "Steam Keys," available at https://partner.steamgames.com/doc/features/keys, accessed on May 2, 2024 ("Steam Keys are a free service we provide to developers as a convenient tool to help you sell your game on other stores and at retail, or provide for free for beta testers or press/influencers.").

[51]   Steam Support, "Retail CD Keys," available at https://help.steampowered.com/en/faqs/view/0E71-0971-324A-1161, accessed on May 6, 2024 ("After the key is registered to your Steam account, it acts as proof of purchase for the game as well as proof of ownership for your Steam account.").

[52]   Steamworks, "Steam Keys," available at https://partner.steamgames.com/doc/features/keys, accessed on May 2, 2024 ("Steam Keys are a free service we provide to developers as a convenient tool to help you sell your game on other stores and at retail, or provide for free for beta testers or press/influencers.").

[53]   See Tom Marks, "Report: Steam's 30% Cut is Actually the Industry Standard," *IGN*, January 13, 2020, available at https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard, accessed on May 6, 2024 ("[A] game retailer taking a 30% cut is fairly common – that means if you buy a game for $60, the retailer generally gets $18 of it.").

above $50 million.[54] Throughout my report, I refer to Steam's 30 percent revenue share rate as its "headline" revenue share rate. When considering the additional revenue share tiers, I refer to Steam's "nominal" revenue share rates of 25 percent (75 percent for the publisher) or 20 percent (80 percent for the publisher). When considering the rate received by a publisher for all of its platform sales regardless of whether those sales occurred on the platform—for example, through the use of Steam keys—I refer to the "effective" revenue share rate.

3.2.   Two-sided platforms and network effects

60.   Digital distribution platforms like Steam connect consumers on the one hand, and publishers on the other. Platforms become successful by providing a high-quality product for both consumers *and* publishers.[55] The better the features of the platform, the more

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[54]   Nick Statt, "Valve's New Steam Revenue Agreement Gives More Money to Game Developers," *The Verge*, November 30, 2018, available at https://www.theverge.com/2018/11/30/18120577/valve-steam-game-marketplace-revenue-split-new-rules-competition, accessed on May 6, 2024 ("Normally, Valve takes around 30 percent of all game sales on Steam, with some exceptions for games from smaller developers in its Steam Direct program. That will remain the case for the first $10 million in sales a game maker or publisher earns. For all sales between $10 million and $50 million, the split goes to 25 percent. And for every sale after the initial $50 million, Steam will take just a 20 percent cut.").

[55]   For example and in the context of early videogame platforms, see Jean-Charles Rochet and Jean Tirole, "Two-Sided Markets: A Progress Report," *The RAND Journal of Economics*, 37(3), 2006, pp. 645–667 ("Rochet and Tirole (2006)") at p. 645 ("Videogame platforms, such as Atari, Nintendo, Sega, Sony, Play Station, and Microsoft X-Box, need to attract gamers in order to persuade game developers to design or port games to their platform, and they need games to induce gamers to buy and use their videogame console."); Jules Herd and Forbes Agency Council, "The Global Surge of Independent Games Development Studios," *Forbes*, August 21, 2023, available at https://www.forbes.com/sites/forbesagencycouncil/2023/08/21/the-global-surge-of-independent-games-development-studios/?sh=628d60dc2a50, accessed on May 6, 2024 ("The democratization of game development through user-friendly software and engines has allowed aspiring developers to bring their visions to life without the need for extensive resources….By optimizing games for multiple platforms—including PC, consoles and mobile devices—studios can reach a vast audience and amplify their game's exposure."). Further, platforms design their revenue sharing structures in order to attract developers and build up their game libraries. See Doug Clinton and Steve Van Sloun, "Increasing Competition in the Game Store Space," *Deepwater Asset Management*, December 27, 2018, available at https://deepwatermgmt.com/increasing-competition-in-the-game-store-space, accessed on May 4, 2024 ("Epic Games is offering 88/12 split in favor of developers[]. Soon after, Discord announced that their game store (launching in 2019) would give developers an even greater share: 90% share of revenue. In response to growing competition, Steam recently revised their revenue share model. When a game makes over $10 million on Steam, revenue share is adjusted to 75/25 and at $50M+ to 80/20. Each new game store is trying to entice developers by offering a larger share of revenues."). Steam especially provides features that benefit both publishers and customers, such as publisher-chosen promotions and player access to games still in development. See Ian Birnbaum, "New Steam Tools Allow Developers to Set Their Own Discounts, Plan Sales," *PC Gamer*, February 26, 2014, available at https://www.pcgamer.com/new-steam-tools-allow-developers-to-set-their-own-discounts-plan-sales, accessed on May 4, 2024 ("Steam has announced new Steamworks tools for developers that will allow them to discount their own games when and how they like. Developers can choose to participate in weeklong deals, add custom discounts, and schedule sales up to two months in advance. … [T]hese new discounting tools put what is arguably the biggest hallmark of the Steam storefront, the Steam sale, in the hands of developers. The traditional Valve-organized sales have often been great for devs and gamers alike."); Jacob Clarke, "6 Steam Features You May Have Missed," *Game Rant*, August 7, 2023, available at https://gamerant.com/steam-features-may-have-missed-hidden, accessed on May 6, 2024 ("Immerse oneself in the world of game development through Steam Early Access. This unique feature

likely it is to draw in participants from both sides of the market. As more and more participants join the platform, the more the platform's value is reinforced through "network effects."

61.   Economists refer to platforms with these features as "two-sided platforms."[56] Two-sided platforms are characterized by both "direct" network effects (i.e., more users on one side of the platform creates higher value for all users on the same side) and "indirect" network effects (i.e., more users on one side of the platform create higher value for users on the other side).[57] In short, two-sided platforms provide more value at scale.

62.   Video game distributors like Valve and its competitors are canonical two-sided platforms. Indeed, Rochet and Tirole (2003, 2006)—important papers on the topic Dr. Schwartz cites[58]—discuss two-sided markets within the context of video games.[59] Dr. Schwartz acknowledges that Steam is a two-sided platform,[60] and that two-sided platforms are characterized by both direct network effects and indirect network effects.[61]

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grants access to games that are still in the development stage, allowing users to experience and provide valuable feedback to the developers. By participating in Early Access, players can directly contribute to shaping the final product, making it a collaborative journey between gamers and developers. … Not only does Steam Early Access offer the chance to engage with favorite titles at an early stage, but it also fosters a sense of community and connection.").

[56]   While Rochet and Tirole would refer to Steam as a platform in a two-sided market, I use the term "two-sided platform" throughout my report so as not to indicate any implicit approval of Dr. Schwartz's proposed antitrust market. See Rochet and Tirole (2006), p. 645 ("Two-sided (or, more generally, multi-sided) markets are roughly defined as markets in which one or several platforms enable interactions between end-users and try to get the two (or multiple) sides 'on board' by appropriately charging each side. That is, platforms court each side while attempting to make, or at least not lose, money overall.").

[57]   Bruno Jullien, Alessandro Pavan, and Marc Rysman, "Two-Sided Markets, Pricing, and Network Effects," *Handbook of Industrial Organization*, 4(1), 2021, pp. 485–592 at p. 558 ("Recall that direct network effects are when the value of a product depends on other consumers purchasing or using the same product whereas indirect network effects are when the value depends on the provision of some complementary good and that provision depends on other consumers purchasing or using the product.").

[58]   See, e.g., Schwartz Report, ¶¶ 335–338.

[59]   Jean-Charles Rochet and Jean Tirole, "Platform Competition in Two-Sided Markets," *Journal of the European Economic Association*, 1(4), 2003, pp. 990–1029 ("Rochet and Tirole (2003)"); Rochet and Tirole (2006).

[60]   Schwartz Report, ¶¶ 30 ("…[P]latforms such as Steam, that connect two or more different groups of users in a physical or virtual space are called two-sided or multi-sided platforms."), 57 ("Steam is a two-sided platform…"), 58 ("…there are two sides to the market, married by a simultaneous purchase and sale of a good (a game).").

[61]   Schwartz Report, ¶¶ 30 ("Platforms often exhibit network effects. Economists define network effects as an attribute of a product or platform, in which the product or platform's value changes as the number of users of that product or platform changes. 'Direct' or 'same-side' network effects exist if, as more users join a platform, the value of that platform increases to all users on that same side of the platform. 'Indirect' or 'cross-side' network effects exist if, as more users of a different group join a platform, the value of the platform increases to the first group of users."), 80 ("Users want access to the platforms that have the most games and other users.").

63.   Consumers value the games that a digital distribution platform brings to the market, as well as the ability to chat with other gamers, read user-generated game reviews, use search tools to find games they might be interested in, get refunds if something goes wrong or they change their minds, and receive customer support (among other things).[62] Developers and publishers value the consumers that exist on a digital distribution platform, as well as features that allow users to modify a game by creating their own content that they can give away for free or sell to other players—building community interest and loyalty for a game; tools to track consumers' gameplay and expenditure habits; the ability to request free Steam keys for testers or reviewers, or to sell on other stores; and tools to set prices in currencies around the world (among other things).[63] A successful distribution platform needs to provide value to both sides of the market; it must balance the desires of consumers with the needs of developers and publishers to provide both groups with a valuable product and services.[64]

64.   Consumers are better off when there are more consumers on the platform because they have access to more competitors, teammates, and user-generated content.[65] Consumers

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[62]   Deloitte, "Fees Applied by Distribution Platforms to Transactions by Developers and Content Providers," September 14, 2023, available at https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/fusions-acquisitions/Publications/deloitte_etude-distribution-platforms.pdf, accessed on May 10, 2024 ("Benefits for end-users: They reduce transaction and research costs by allowing users to quickly and cheaply discover apps/content through a single platform, [t]hey curate / promote / rank content based on relevance, quality and other performance metrics, [t]hey promote the production of innovative, high-quality content as the presence of network effects pushes developers to innovate to attract new users, [t]hey provide a secure browsing and purchasing environment, [t]hey provide centralized customer support and purchase management, [t]hey provide content-specific information and reviews in a consistent format").

[63]   Deloitte, "Fees Applied by Distribution Platforms to Transactions by Developers and Content Providers," September 14, 2023, available at https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/fusions-acquisitions/Publications/deloitte_etude-distribution-platforms.pdf, accessed on May 10, 2024 ("Benefits for developers/content providers: They create trust capital for developers (e.g., end-users can rely on the platform's vetting processes and security protocols), [t]hey reduce transaction costs (e.g., by providing ready to use interfaces for integrating advertisements into apps, usually combining technology management and payment), [t]hey facilitate entrance to markets and opportunities for growth by enabling fast and inexpensive access to end-users, [t]hey reduce app and content production costs by benefiting from economies of scale and efficiency gains (costs are spread across a large customer base), [t]hey facilitate purchases in multiple local forms of payment, [t]he current configuration of many platforms allows for multi-platform and multi-device distribution, [t]hey enable different strategies for monetization of apps, content, and services"). See also Steamworks, "Features," available at https://partner.steamgames.com/doc/features, accessed on May 6, 2024.

[64]   Rochet and Tirole (2006), p. 645 ("That is, platforms court each side while attempting to make, or at least not lose, money overall.... Videogame platforms, such as Atari, Nintendo, Sega, Sony Play Station, and Microsoft X-Box, need to attract gamers in order to persuade game developers to design or port games to their platform, and they need games to induce gamers to buy and use their videogame console.").

[65]   Jordan Minor, "The Best Multiplayer Video Games for 2024," *PCMag*, December 22, 2022, available at https://www.pcmag.com/picks/the-best-multiplayer-video-games, accessed on May 6, 2024 ("[S]ome of the best gaming-related experiences come from moments shared with other people. After all, an excellent multiplayer mode makes a video game endlessly replayable, and enables good times with local friends or strangers across the country"); Venkatesh Shankar and Barry L. Bayus, "Network Effects and Competition: An Empirical Analysis of the

are also better off when there are more developers and publishers on the platform because, for example, they can store and access all their games in one place and they can better shop for new games.[66] There are similar network effects on the developer and publisher side of the platform. Developers and publishers are better off when there are more consumers on the platform because they have access to a larger pool of potential buyers and more users who can find their games on the platform. They are also better off with more developers and publishers on the platform because it brings more consumers to that platform and consumers may be more likely to buy games from similar developers or publishers.[67] These network effects incentivize platform operators like Valve to continue to invest in features that will improve experiences and draw more buyers, developers, and publishers over time.

4.   Dr. Schwartz's proposed damages estimation is unreliable and cannot estimate class-wide damages through a common methodology and common evidence

65.   Dr. Schwartz claims that his damages model can estimate class-wide damages using a common methodology and common evidence.[68] In this section, I demonstrate that his model does not do so, and that it cannot do so. I find that Dr. Schwartz's damages analysis is unreliable, and that he cannot estimate damages (if any) to proposed class members without individualized inquiry.

Home Video Game Industry," *Strategic Management Journal*, 24(4), 2003, pp. 375–384 at p. 377 ("The network effects associated with a large customer base of hardware users are very important in this industry since they are typically associated with increased complementary products (e.g., software titles, licensed products, television cartoon shows, videos and movies), which in turn leads to greater utility and thus greater hardware demand. There are also benefits to a large user base from the word-of-mouth discussions of game strategies and experiences that take place between users of the same hardware system, as well as from the borrowing and swapping of games.").

[66]   Jordan Minor, "The Best Places to Buy and Rent PC Games Online in 2024," *PCMag*, November 15, 2023, available at https://www.pcmag.com/picks/the-best-places-to-buy-and-rent-pc-games-online, accessed on May 6, 2024 ("Steam is by far the biggest and most important PC gaming marketplace—the store is virtually synonymous with PC gaming. Its massive library and innovative features make gaming on your computer more approachable and appealing than ever.... It has the hottest AAA releases, creative indies, and classics at discount prices.").

[67]   Carmelo Cennamo and Juan Santalo, "Platform Competition: Strategic Trade-Offs In Platform Markets," *Strategic Management Journal*, 34(11), 2023, pp. 1131–1350 at p. 1338 ("This is consistent with theory in the competitive strategy literature that conceives rivalry between two firms as the potential level of competition for underlying resources, determined by the extent to which such firms occupy the same or overlapping market segments (see Ketchen et al., 2004 for an extensive review of this literature). In these terms, competition among videogame producers will be higher in the platform console market segment that is more crowded, i.e., the one in which a larger number of producers with similar market domains are vying for consumers' attention.").

[68]   Schwartz Report, ¶¶ 399–400.

66.   I begin by explaining, at a high level, the mechanics of Dr. Schwartz's flawed damages model and the unreliable assumptions that underpin it (Section 4.1).

67.   Next, in Section 4.2, I explain that Dr. Schwartz makes theoretical and empirical assumptions in his damages analysis that do not match the economic characteristics of the video game industry and video game distribution platforms, and that render his damages model unreliable. Dr. Schwartz's model fails to account for critical economic characteristics of video game consumers, developers, publishers, distributors, and the alleged PMFN itself. Dr. Schwartz ignores the individual circumstances of consumers and proposed class members in favor of assumptions and aggregations. Furthermore, Dr. Schwartz's model does not allow for fundamental economic decision-making by consumers, publishers and developers, or platforms. Taken together, Dr. Schwartz makes unfounded simplifying assumptions that contradict economic fundamentals of the industry and lead his model to generate flawed and misleading estimates of alleged harm. These unfounded assumptions render his damages model unreliable for establishing common harm among proposed class members.

68.   In particular:

- Dr. Schwartz ignores the differentiated features of distribution platforms that drive publishers' decisions regarding platform use (Section 4.2.1).
- Dr. Schwartz assumes a common decline in proposed class members' revenue shares in the but-for world,[69] without appropriate justification, and despite evidence of proposed class members' differentiated revenue shares observed in the real world (Section 4.2.2).
- Dr. Schwartz assumes, rather than demonstrates, that proposed class members would "pass through" changes in Steam's revenue share in a common fashion (Section 4.2.3).
- Dr. Schwartz ignores the two-sided nature of distribution platforms and the network effects these platforms benefit from, which drive developers and publishers to use these platforms; instead, Dr. Schwartz assumes a but-for world dependent upon arbitrary assumptions (Section 4.2.4).

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[69]   Throughout my report, when I refer to "declines" in revenue shares, I refer to the shares Valve retains (e.g., a decline from the 30 percent Valve retains, meaning a rise in the 70 percent paid to publishers).

69.   These modeling choices assume—rather than show—common damage to the proposed class. Furthermore, Dr. Schwartz's model is ill-suited for estimating harm to individual proposed class members using common proof. Throughout Section 4.2, I show that any attempt to reliably estimate alleged damages to proposed class members would necessitate inquiry into the individualized circumstances of consumers, developers, publishers, and distributors, requiring data that Valve does not have and that are not available in this litigation.

70.   Finally, in Section 4.3, I show that empirical analyses demonstrate that Dr. Schwartz's damages estimates are highly sensitive to alternative assumptions about publishers' substitution across platforms (Section 4.3.1), effective revenue shares based on use of Steam keys (Section 4.3.2), and pass-through rates (Section 4.3.3). Determining which publishers are harmed—let alone by how much—would require individualized inquiry into all of these factors for each proposed class member.

4.1.   Overview of Dr. Schwartz's proposed damages model and the fundamental flaws that make it unreliable

71.   In this section, I summarize Dr. Schwartz's attempt to estimate economic damages in this matter and provide a brief overview of the unreliable assumptions that underpin his calculations.

72.   Before delving into Dr. Schwartz's model, it is useful to explain the goal of economic modeling. In the words of Prof. Jeffrey Perloff, "Economists use models to make testable predictions."[70] Specifically:

> "Economists also use models to *predict* how a change in one variable will affect another ... A good model makes sharp, clear predictions that are consistent with reality. Some very simple models make sharp predictions that are incorrect, and other more complex models make ambiguous predictions—any outcome is possible—which are untestable. The skill in model building is to chart a middle ground."[71]

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[70]   Jeffrey M. Perloff, *Microeconomics*, Seventh Edition, (Boston: Pearson Education, 2015), p. 1.

[71]   Jeffrey M. Perloff, *Microeconomics*, Seventh Edition, (Boston: Pearson Education, 2015), pp. 3–4.

73.   For example, if the modeling goal is to evaluate the impact of allegedly anticompetitive conduct, the model should be built to provide "sharp, clear predictions" with and without that conduct. Throughout this report, I differentiate between the "as-is" world—that is, the world represented by Dr. Schwartz in his models subject to the alleged conduct—and the "but-for" world—that is, the world represented by Dr. Schwartz in his models without the alleged conduct. A good model of the as-is world should make predictions that are consistent with reality. The predictions of the but-for world should follow from a small change: the removal of the alleged conduct, holding everything else constant. As I explain in this section, Dr. Schwartz's damages model does no such thing and therefore cannot predict economic damages stemming from the challenged conduct.[72]

74.   Economic damages are defined as class members' loss of economic value caused by the defendant's allegedly harmful act. This is measured by loss of economic value in the real world as compared to a world absent the challenged conduct (the but-for world).[73] Estimating economic damages requires (i) defining a but-for world; (ii) proposing a methodology to determine class members' economic position in this but-for world; and (iii) comparing class members' economic position in that but-for world to their economic position in the as-is world.

75.   In this case, Dr. Schwartz's damages model attempts (but fails) to show how revenue shares would change for proposed class members in a but-for world absent Valve's alleged PMFN.[74] Plaintiffs allege that Valve enforces a policy—the alleged PMFN—where developers and publishers may not offer their games for lower prices or with different content on rival PC distribution platforms.[75] As a result of the alleged PMFN, Plaintiffs

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[72]   In his report, Dr. Schwartz's interpretation of the "as-is" world I describe here is one in which the alleged PMFN exists, and his interpretation of the "but-for" world is one without the alleged PMFN. As such, some of his analysis uses the terms "With PMFN" and "Without PMFN" to describe the "as-is" and "but-for" worlds, respectively. See, e.g., Schwartz Report, ¶¶ 154, 242, 281, 302, 334, Table 3.

[73]   See, e.g., Mark Allen, Robert Hall, and Victoria Lazear, "Reference Guide on Estimation of Economic Damages," in *Reference Manual on Scientific Evidence*, Third Edition, (Washington, DC: Federal Judicial Center and The National Academies Press, 2011), pp. 425–502 at p. 429 ("The goal of damages measurement is to find the plaintiff's loss of economic value from the defendant's harmful act.").

[74]   According to Dr. Schwartz, Valve "ensures parity both in terms of the content included in games and prices" through the alleged PMFN, and that "the parity requirements mean that no publisher can differentiate its offerings across competing platforms." See Schwartz Report, ¶¶ 150, 154, 173. While Dr. Schwartz claims that the alleged content parity is important, he does not address content parity in his model of his as-is world or its removal in his but-for world. As I explain throughout this section, Dr. Schwartz fails to model features of the industry he is analyzing, which casts doubt on the reliability of his results. For example, supposing the content parity allegation were true and were to disappear in the but-for world, Dr. Schwartz has not modeled how differentiated content would impact but-for market shares for different platforms. Alternatively, if no content differentiation were to occur in the but-for world, then content parity in the alleged PMFN would not result in harm.

[75]   Complaint, ¶¶ 9, 156.

allege that Valve's revenue share for sales on Steam is supracompetitive.[76] Dr. Schwartz claims that the damages owed to publishers in this matter stem from these allegedly supracompetitive revenue shares.[77] Dr. Schwartz's damages model attempts to estimate but-for revenue shares for each game and each publisher—and he purports to be able to do this using common evidence.[78]

76.   However, Dr. Schwartz has not proposed a reliable damages model that is capable of showing common harm using common evidence or estimating either class-wide or individual proposed class members' damages. This is because Dr. Schwartz's model does not reflect economic reality: it fails to account for critical economic characteristics of video game consumers, developers, publishers, distributors, and the alleged PMFN itself. He uses an off-the-shelf model (the Landes and Posner model) of a single dominant firm that faces competition from a fringe of small firms, ignoring consumer choice and conflicting with important economic features of the industry.[79] He then uses this model to determine the *firm*-level revenue share (rather than game-level), in a market with a firm facing a *single-sided* pricing decision (rather than two-sided), with *no* model of the choice of PMFN (rather than modeling the at-issue conduct). He then *assumes* that his predictions of Valve's but-for revenue share can apply to all games and all publishers on Steam. He further assumes publishers pass through this change in revenue share onto consumer prices in an identical fashion.

77.   Dr. Schwartz's flawed damages estimation proceeds in four general steps, each based on assumptions that lack a reliable basis in economic reality. I summarize the steps here.

78.   **Step 1: Calculation of Steam's but-for revenue share.** Dr. Schwartz does not model the impact of a PMFN. Rather, the crux of Dr. Schwartz's damages model is an equation that (allegedly) allows him to calculate Steam's but-for revenue share as a function of his flawed estimates of: (i) Steam's proposed as-is and but-for market shares; (ii) Steam's

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[76]   Complaint, ¶¶ 154–155.

[77]   Schwartz Report, Section 8.5.

[78]   Schwartz Report, ¶¶ 400, 404 ("To estimate the damages associated with an individual putative class member, I apply a consistent methodology to all putative class members ... Commission rates can vary among the titles offered by an individual publisher based on Steam's actual commission structure; this calculation necessarily considers an actual and but-for rate for each product sold.").

[79]   William M. Landes and Richard A. Posner, "Market Power in Antitrust Cases," *Harvard Law Review*, 94(5), 1981, pp. 937–996 ("Landes and Posner (1981)") at p. 944 ("To show this concretely, we shall use the example of a single large or dominant firm (firm *i*) that faces competition in its sales from a fringe of domestic firms (called *j*), each with a trivial share of the market."). Dr. Schwartz's model is "derived from Landes and Posner." See Schwartz Report, ¶ 334.

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marginal costs; and (iii) Steam's current revenue share.[80] Dr. Schwartz derives this equation from a generic model of competition (the Landes and Posner model) that is *not* adapted to the realities of the video game industry, and that does *not* allow him to model the effect of a PMFN.[81]

79.   As inputs into the equation, Dr. Schwartz uses his estimates of Steam's as-is market share, as-is marginal cost, and as-is revenue share.[82] He assumes Steam's but-for marginal cost would be the same as its as-is marginal cost.[83] As a final input, Dr. Schwartz assumes— *without any empirical or theoretical justification*[84]—that in the but-for world, Steam's proposed market share (as a platform selling games from tens of thousands of publishers)[85] in his alleged "third-party digital PC game distribution" market from 2017 to

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[80]   The specific formula is:

$$But\text{-}for\ revenue\ share = \left(\frac{But\text{-}for\ market\ share}{Actual\ market\ share}\right) \times (Actual\ revenue\ share - Marginal\ cost) + Marginal\ cost$$

See Schwartz Report, footnote 854 which reports the same formula with specific numbers plugged in ("███████████████").

[81]   Schwartz Report, ¶¶ 333–334, Appendix A.2. The Landes and Posner model is a standard theoretical model that was designed to provide an economic foundation to antitrust policy debates in the 1980s. See Landes and Posner (1981), p. 937 ("In this Article, Professors Landes and Posner present an economic analysis of market power that provides the necessary foundation for application to particular cases and for formulation of antitrust policy."). It assumes that a dominant firm competes with a fringe of small firms in supplying a common (or "homogeneous") product. See Landes and Posner (1981), p. 944 ("To show this concretely, we shall use the example of a single large or dominant firm (firm i) that faces competition in its sales from a fringe of domestic firms (called j), each with a trivial share of the market...We assume initially that all the firms in the market produce the same product..."). The model is not meant to capture platform competition: there are no intermediaries; there are only firms that sell directly to consumers; there is no two-sided market. The model assumes that the dominant firm determines a single, common price for a single, common product. To develop the specific equation that Dr. Schwartz uses to calculate but-for revenue shares, he makes additional assumptions regarding the shape and shift of the demand curve in the but-for world. For example, Dr. Schwartz assumes that Steam faces linear residual demand from publishers. See Schwartz Report, ¶ 356 ("I model Steam's demand as linear and use Steam's real-world firm elasticity of demand to calculate the slope of Steam's demand curve."). That is, he assumes that Steam would gain the same market share if it were to change its revenue share from 30 percent to 29 percent as from 15 percent to 14 percent. See Schwartz Report, ¶ 361 ("I quantify Q (quantity) as a market share rather than transacted dollars").

[82]   Schwartz Report, ¶¶ 352–353, 361. Specifically, Dr. Schwartz uses ███ percent as Steam's actual market share, ███ percent as its marginal cost, and ███ percent as its actual revenue share. See Schwarz Report, footnote 854. I do not provide an affirmative opinion on the correct antitrust market or how to use Steam's accounting data to estimate Steam's marginal costs. However, Dr. Schwartz's estimate of as-is revenue share is fundamentally flawed, as I discuss below.

[83]   Schwartz Report, ¶ 368.

[84]   Dr. Schwartz testified that he could not "test the reliability" of his but-for market share predictions. See Deposition of Steven Schwartz, April 18, 2024 ("Schwartz Deposition"), pp. 95:25–96:11 ("Q. What did you do to test the reliability of your prediction that the market shares that you list in figure six would be the market shares that would obtain today in the but-for world? A. Well, as I said, unfortunately Valve never gave us the clean period in which the behaviors at issue didn't emerge, so we can't test the reliability against some natural experiment that the market continues.").

[85]   Schwartz Report, ¶ 399 ("There are 31,824 publishers meeting these criteria that also have positive net revenue over the damages period in Valve's transaction data.").

2022 would be equal to Valve's share (as a publisher selling its own games) of the revenues that it and seven other PC video game publishers earned from selling just their own games on Steam between January 2008 and December 2012.[86] To put it differently, to estimate Steam's market share, Dr. Schwartz uses observed sales shares (on a single distribution platform, Steam) of only eight publishers between 2008 and 2012; of these eight publishers, he finds that Valve had a ▮ percent share of sales as a publisher; he then assumes that Steam's market share in the but-for world until 2022 (this time as a distribution platform, not as a publisher) would be ▮ percent.[87] I am aware of no support in the peer-reviewed economics literature or the facts of this case for this unprecedented method of assuming market shares.

80.   Finally, to estimate Steam's but-for revenue shares for each publisher, he *assumes* that removing the alleged PMFN would affect the revenue share each publisher would pay in the but-for world in an identical fashion.[88] In doing so, he rules out publishers' ability to substitute more (or less) strongly away from Steam absent the alleged PMFN, and he eliminates the possibility that potential entrant platforms might choose to specialize in games that appeal to particular customers or that are produced by particular publishers.

81.   **Step 2: Calculation of overcharge.** Dr. Schwartz defines the "overcharge" for a given publisher as the publisher's difference in revenue shares paid to Valve in the as-is world and but-for world.[89] Based on his assumptions about Valve's revenue shares in the but-

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[86]   Schwartz Report, ¶ 12 ("The relevant antitrust market for purposes of my analysis is a worldwide market for third-party digital PC game distribution via platforms."). Specifically, Dr. Schwartz calculates eight publishers' revenue shares on Steam between January 2008 and December 2012 and assumes these publishers would each develop distribution platforms with market shares equivalent to those publishers' revenue shares on Steam during this specific window of time. See Schwartz Report, ¶¶ 374–376. Dr. Schwartz bases Steam's but-for market share on its first-party sales on Steam (i.e., sales of Valve games on Steam) even though first-party sales are excluded from Dr. Schwartz's proposed antitrust market.

[87]   Schwartz Report, ¶¶ 375–376.

[88]   Dr. Schwartz computes an aggregate scaling factor based on the aggregate level of Steam's effective revenue share in his as-is and but-for worlds. He assumes this ratio can be commonly applied to all publishers, and he scales each publisher's as-is revenue share by this ratio to determine each publisher's but-for revenue share. See Schwartz Report, ¶ 401 ("To determine the overcharge associated with a given commission rate, I scale the commission rates calculated in the transaction data by a ratio of the but-for commission rate to the overall effective commission rate in the damages period. The effective commission rate from Valve's transaction data is ▮. The but-for commission rate I calculate above is 17.7% (see Section 8.3.5). Next, I multiply commissions paid to Valve by ▮ to arrive at a but-for commission for a given commission rate.").

[89]   Schwartz Report, ¶¶ 398 ("Total overcharge refers to all commissions taken by Valve in excess of a competitive commission rate."), 400. According to Dr. Schwartz, his overcharge calculation is conservative because it does not consider the possible change in quantity of sales as a result of Steam's lower revenue share. See Schwartz Report, ¶ 405 ("Note that this overcharge calculation, and thus the associated damages calculation, is conservative, as it only accounts for the lower commission rate. This calculation does not consider the change in quantity of sales as a result of the lower commission rate (and resulting lower consumer price).").

for world, Dr. Schwartz applies a common change in revenue shares to the revenues each publisher earned on Steam. As I explain in Section 4.2.2, this approach is fundamentally flawed: Dr. Schwartz ignores factors such as the use of Steam keys that affect any change in revenue shares differently for each publisher. In short, Dr. Schwartz calculates publisher-level and product-level overcharges as the difference between a product's estimated as-is and but-for revenue shares (as calculated in Step 1), multiplied by all revenues for that product.[90]

82.   **Step 3: Estimation of pass-through rates.** The concept of "pass through" refers to the extent that a firm passes on changes in costs to consumers by raising or lowering its prices.[91] In the context of Dr. Schwartz's model, the pass-through rate refers to the fraction of a change in Valve's revenue share on Steam revenues that publishers "pass through" to consumers in the form of lower or higher prices. The higher the pass-through rate, the greater the ability of a publisher to pass on any supracompetitive price increases to consumers, and therefore the lower the harm to that publisher from the challenged conduct.[92]

83.   To obtain an estimate of pass-through for his damages model, Dr. Schwartz relies on the introduction of Steam's tiered revenue share in 2018 to estimate the extent to which he claims a select group of publishers of 124 games affected by this change passed through the resulting revenue share decrease to consumer prices.[93] He first assumes that the price changes for all 124 games were solely the result of pass-through, then uses the median pass-through rate from this exercise as an input into his damages calculation (ignoring substantial variation in pass-through rates across publishers). As I explain in Section 4.2.3, this approach is fundamentally flawed: Dr. Schwartz assumes, without any justification,

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[90]   Schwartz Report, ¶ 402 ("To calculate Valve's overcharge for an individual publisher, I begin by calculating the percent overcharge for that publisher. I then apply that percent overcharge to the actual associated revenues.").

[91]   See B. Douglas Bernheim and Michael Whinston, *Microeconomics*, (New York: McGraw-Hill/Irwin, 2008), p. 641 ("The **pass-through rate** is the increase in price that occurs in response to a small increase in marginal cost, measured per dollar of increase in marginal cost.").

[92]   Specifically, a higher pass-through rate results in lower damages in Dr. Schwartz's damages model. See Schwartz Report, Figure 9 ("Passthrough rate: 25%, Estimated Damages (Total): ▮▮▮▮▮▮▮; Passthrough rate: 20%, Estimated Damages (Total): ▮▮▮▮▮▮▮").

[93]   Schwartz Report, ¶¶ 390–396. Dr. Schwartz estimates pass-through for changes in Valve's revenue shares stemming from the introduction of tiered revenue shares on October 1, 2018 through the end of his data on December 31, 2022. Specifically, to estimate pass-through for this sample of games, Dr. Schwartz analyzes the difference in average daily price between the 360 days before the reduction in revenue share from Valve's tiered revenue shares and the 360 days after the reduction. See Schwartz Report, ¶ 394 ("For each base game package, I use the 360-day average daily price after the commission rate change to calculate the percentage price decrease from the 360-day average daily price prior to the commission rate change.").

that a select group of publishers' average response to the introduction of revenue tiers is a valid proxy for how diverse developers and publishers would respond to the removal of the alleged PMFN—even if that removal had dramatic effects on market structure.[94]

84.   **Step 4: Calculation of damages.** In his final step, Dr. Schwartz multiplies the common "overcharge" from step 2 by the common pass-through rate from step 3 to determine alleged damages for each publisher.[95]

4.2.   Dr. Schwartz's proposed damages model assumes, rather than demonstrates, common harm across proposed class members; individualized inquiry is necessary to estimate damages

85.   To establish and estimate harm to the proposed class, Dr. Schwartz must propose a model that accurately predicts how proposed class member publishers and developers would respond in the but-for world, taking into account their individual circumstances. He must do this because individual circumstances matter to publishers' business decisions. Without understanding and predicting publishers' business decisions—which would necessitate individualized information he and Valve both lack—Dr. Schwartz cannot reasonably model industry-wide responses to estimate aggregate damages. Further, by failing to understand the individual circumstances of each publisher, Dr. Schwartz cannot reasonably estimate individual proposed class members' damages.

86.   As I will discuss below:

- Some proposed class members are large firms that sell games in many venues (including PC distribution platforms, their own websites, brick-and-mortar stores, online stores, and digital console storefronts), and that might change their relative usage of these venues in the but-for world; while others are small firms that sell exclusively on Steam, and that might continue to make the same distribution decisions absent the challenged conduct. These two types of firms would be differentially harmed (if at all) by the challenged conduct (Section 4.2.1).

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[94]   Dr. Schwartz predicts that the removal of the alleged PMFN would decrease Steam's market share in the alleged relevant market from ▮▮ percent to ▮▮ percent—a dramatic effect. See Schwartz Report, ¶¶ 361 ("I use ▮▮▮ as Steam's real-world market share..."), 376 ("I adopt Valve's ▮▮▮ share of revenues as Steam's but-for market share.").

[95]   Schwartz Report, ¶ 402.

- Proposed class members differ in their use of Steam keys in the real world, which affects the effective revenue share each publisher pays to Valve; publishers may also vary in their use of Steam keys in the but-for world, resulting in differential harm across publishers (Section 4.2.2).

- Proposed class members cater to audiences with different preferences and price sensitivities, and thus may vary in the degree to which they chose to, or can, pass through changes in their revenue shares to consumers—and therefore in the extent to which they could be harmed by allegedly supracompetitive revenue shares on Steam (Section 4.2.3).

- Due to the network effects in the industry, proposed class members would tend to consolidate their sales—and consumers would tend to consolidate their purchases—on a small set of distribution platforms; the competition for publishers between platforms in the but-for world would determine the extent of harm (if any) for different publishers (Section 4.2.4).

87.   As these points illustrate, understanding the individual circumstances of consumers, developers, publishers, platforms, and the interactions among them is necessary to estimate harm—if any—to the proposed class.

88.   However, over and over again, Dr. Schwartz chooses to assume that market features are the same across consumers, developers, and publishers rather than engage with the substantial evidence of extensive differences. As a result, Dr. Schwartz's proposed damages model assumes, rather than demonstrates, common harm to the proposed class. As I show in the rest of this section, Dr. Schwartz ignores important economic differences within the proposed class that render his model incapable of proving harm to, or estimating damages for, any proposed class member using a common method and common evidence. Individualized inquiry into factors such as the supply and demand conditions each publisher faces, their differing use of Steam keys, and their use of different distribution channels is necessary to establish the extent to which any proposed class member was damaged by Valve's alleged conduct (if at all). Any sound analysis of damages in this matter requires individualized inquiry into the economic circumstances of proposed class members and cannot be conducted using common proof.

4.2.1.   *Dr. Schwartz ignores the differentiated features of distribution platforms that drive publishers' decisions regarding platform use*

89.   Platforms differ in the features they offer, and publishers differ in how they value those features.[96] Dr. Schwartz does not model these features that platforms offer, the determinants of publisher choices, or the varied consumer bases of platforms that drive these publisher choices. Further, Dr. Schwartz does not model publishers' choice of platform based on the revenue shares platforms charge, let alone the other features platforms offer.[97] Dr. Schwartz's model yields a mechanical relationship between the proposed market share and revenue share for Steam, and all other platforms have neither individualized revenue shares nor individualized market shares.[98] Dr. Schwartz has no basis for these modeling choices. In fact, publishers care not just about a platform's revenue shares, but also about many other features—which vary across platforms—and preferences over these features differ from publisher to publisher.[99] Therefore, a

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[96]   Robin Valentine, "PC Gaming's Many Launchers, Reviewed for 2024: Steam Still Puts the Rest to Shame," *PC Gamer*, January 30, 2024, available at https://www.pcgamer.com/pc-gamings-many-launchers-reviewed-for-2024-steam-still-puts-the-rest-to-shame/, accessed on May 6, 2024 ("Whether you're a Steam devotee or have a taskbar overflowing with different logos, launchers are a staple (and unavoidable) part of modern PC gaming. And because they're so ubiquitous, it's hard not to have strong feelings about them, adding to your book of grudges every time one of them bugs out on you, changes a key feature you loved, or just commits the crime of making you stretch your game library across yet another app."); Schwartz Report, ¶ 65 ("In making distribution choices, publishers will consider a variety of factors, in addition to the ability of gamers to be able to access and play the game. These include, for example, the size of the user base, the availability of other services from the platform operator, including game development tools, marketing support, and the like."). Dr. Schwartz also claims that platforms are differentiated, and that "each platform must make decisions about the overall aesthetic of their website or app, how reviews are handled, which games are added to their platform, how those games are displayed to consumers, and what type of content moderation (if any) exists." See Schwartz Report, ¶ 220.

[97]   Dr. Schwartz describes his model as "My Landes and Posner model." See Schwartz Report, ¶ 12. In the Landes and Posner model, all firms offer the same product at the same price. Firms choose the quantity of the product supplied but not its price. The only choice consumers make in the Landes and Posner model is whether to buy the homogeneous good that is offered at the same price by all firms (the model includes a downward sloping aggregate demand of a homogeneous product offered at the same price). See Landes and Posner (1981), pp. 944 ("We assume initially that all the firms in the market produce the same product"), 984 ("[W]e refer to the supply elasticity of the competitive fringe … This equals the percentage increase in their supply for a 1% increase in price."), 985 ("Notice that price is a negative function of quantity … Assuming the firm desires to maximize profits, its optimal output and price are obtained by differentiating π with respect to Q and setting the resulting expression equal to zero … The demand for the output of firm i at a given price (Q_i^d) is simply the market demand Q_m^d minus the amount supplied by competing firms (Q_j^s)."). As a result, Dr. Schwartz's model does not specify which publisher buys from which platform or how a publisher would choose between platforms that all offer the same revenue share.

[98]   All other platforms belong to "the fringe" in the Landes and Posner model. See Schwartz Report, ¶ 345 ("Landes and Posner expand on the standard Lerner Index formula by explaining that the firm elasticity of demand—and by extension the firm's market power—can be derived using firm i's market share (S_i), the market elasticity of demand (ϵ_m^d), and the supply elasticity of competing (or 'fringe') firms (ϵ_j^s).").

[99]   Deposition of Tom Giardino (Valve), November 2, 2023, p. 84:7–18 ("Q. You testified earlier that you're aware that Epic Games Store— or Epic Games, that is, pays significant amounts for games to be exclusive to the Epic Games Store? A. That is my understanding, yes. Q. Okay. Have you ever had a conversation within Valve that Valve needs to do the same in order to attract or keep games on its system and platform? A. When we've discussed that topic, we've always concluded the more interesting and long-term beneficial way to compete is providing services

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publisher's presence on a given platform in the but-for world, which games it would sell there, and how much it would charge, are matters that can be determined only through individualized inquiry into individual information about publishers.

90. **Other platforms' features impact publishers' choices of where to sell their products and what prices to set.** Dr. Schwartz ignores features that distinguish distribution platforms in his model. In reality, proposed class members differ in their platform preferences, and would choose alternatives to Steam differently in the but-for world. Some developers and publishers distribute their games exclusively on one platform, whereas others sell games across multiple platforms. For example, EGS has from its beginning regularly offered Epic-exclusive games, including from some of the most popular publishers,[100] and recently introduced a broad opt-in exclusivity program for third-party developers.[101] Dr. Schwartz recognizes these differences in his report. He acknowledges that some publishers choose to be on some platforms and not on others due to, for example, differences in production scale, distributor-publisher negotiations, distributor strategy/preferences, and publisher strategy/preferences.[102] Nevertheless, Dr. Schwartz excludes these essential facts from his model.

91. **Platform differentiation would lead publishers to make alternative platform choices in Dr. Schwartz's but-for world.** Because publishers have individualized preferences and business strategies, individual publishers would substitute to other platforms to a different extent in Dr. Schwartz's but-for world. For example, some publishers might keep their games exclusively on Steam, while others might leave Steam entirely and publish on a single competing platform. Others might publish on many platforms. To understand

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and features that customers want and developers benefit from."); Deposition of Kristian Miller (Valve), October 3, 2023, p. 91:14–18 ("Q. And what were those high-impact features? A. There were a broad number of them. As I mentioned before, some examples would include our improvements to communication and exhibition features as well as discoverability on the storefront.").

[100] Andy Chalk, "Epic Goes on the Hunt for Even More Exclusives with a New Program Offering Bigger Payouts to Smaller Studios," *PC Gamer*, August 23, 2023, available at https://www.pcgamer.com/epic-goes-on-the-hunt-for-even-more-exclusives-with-a-new-program-offering-bigger-payouts-to-smaller-studios/, accessed on May 6, 2024 ("The Epic Games Store has grown into a successful, major digital storefront since its launch in 2018 in large part due to exclusive game releases: Epic has used the massive financial success of Fortnite to pay publishers in advance to launch games on its storefront, and more to the point, not launch them on Steam, at least temporarily. It's managed to attract some big names over the years, like Borderlands 3, Control, Hitman 3, and Kingdom Hearts.").

[101] Epic Games, "Introducing the Epic First Run Program," August 23, 2023, available at https://store.epicgames.com/en-US/news/introducing-the-epic-first-run-program, accessed on May 2, 2024.

[102] Schwartz Report, ¶ 65 ("In making distribution choices, publishers will consider a variety of factors, in addition to the ability of gamers to be able to access and play the game. These include, for example, the size of the user base, the availability of other services from the platform operator, including game development tools, marketing support, and the like. For example, Valve provides a large global user base through the Steam platform, but also provides developer access to Steamworks tools and services.").

harm to proposed class members due to an alleged overcharge, Dr. Schwartz needs to properly estimate the but-for revenue shares those publishers would have paid.[103] For publishers that would switch to a single competing platform, the relevant but-for effective revenue share is not Steam's but-for revenue share; instead, the relevant consideration is the but-for revenue share on this other platform. For others, the relevant but-for revenue share is a mix of the but-for revenue shares on the various platforms they would publish their games on.

92.   However, Dr. Schwartz's model does not—and cannot—predict the platform choices of individual publishers. This means he cannot determine the relevant but-for revenue shares for each game and each publisher. Instead, he assumes revenue shares for each game and each publisher would decline by a common fraction (of about one-third) in the but-for world.[104] He provides no empirical support for this assumption.[105]

93.   Failing to account for platform substitution renders Dr. Schwartz's damages model unreliable. As Dr. Schwartz acknowledges, substitution to other platforms matters for his damages calculations because different platforms would likely charge different revenue shares in the but-for world.[106] Indeed, this is already the case in the real world. For example, Steam charges a headline revenue share of 30 percent (or a nominal revenue

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[103]   This shortcoming in Dr. Schwartz's model is over and above his assumption that platforms set the same revenue share in the but-for world. As highlighted above, Dr. Schwartz's but-for revenue for Steam is a *mechanical* result from his other assumptions, including but-for market share.

[104]   Schwartz Report, ¶¶ 401–402 ("To determine the overcharge associated with a given commission rate, I scale the commission rates calculated in the transaction data by a ratio of the but-for commission rate to the overall effective commission rate in the damages period. The effective commission rate from Valve's transaction data is ███ The but-for commission rate I calculate above is 17.7% (see Section 8.3.5). Next, I multiply commissions paid to Valve by ███ to arrive at a but-for commission for a given commission rate. Finally, to determine overcharge at a given commission rate, I subtract the scaled but-for commission rate from the calculated commission rates. This is equivalent to calculating the overcharge as ███ of the commissions paid.").

[105]   As I discuss throughout this report, Dr. Schwartz's assumption of a common decline in the revenue share across games and across publishers is inappropriate. This assumption implies many contrary-to-facts results. In the context of platform choice, this assumption would mean that all publishers stay on Steam (and Valve's revenue share declines by a common ratio) or all of Steam's competitors reduce their revenue share to the exact level that makes the choice of platform irrelevant. Neither result is credible. In the former case, it cannot be that all publishers stay on Steam and make the same sales, because Dr. Schwartz predicts that Steam's market share falls from ███ percent to ███ percent. The latter case would require implausible coordination across games, publishers, and platforms to guarantee an identical result.

[106]   Schwartz Report, ¶ 373 ("In the but-for world, the newly entering or existing fringe platforms would have been able to better attract third-party PC content by offering publishers a greater share of transaction value so that such publishers could offer their games at lower prices on these platforms. These lower prices would, in turn, help to attract gamers to the platform. But for Valve's alleged anticompetitive conduct, publishers that continue to operate their distribution platforms would likely have garnered a larger share of the market, and it is likely that at least some of the publishers that stopped operating their distribution platforms would have continued to operate their platforms.").

share of 25 percent or 20 percent depending upon a game's total sales), whereas EGS charges a headline revenue share of 12 percent and consoles charge a headline revenue share of 30 percent.[107]

94. **In sum, Dr. Schwartz has not put forth a common methodology using common evidence to estimate the extent to which individual publishers would substitute to other platforms in the but-for world.** Nor has he put forth a methodology to estimate but-for revenue shares for individual publishers on other platforms. Doing so would require: (i) information on publishers' current presence on other platforms; (ii) knowledge of each publisher's financial incentives to use different platforms (including information on individually negotiated deals,[108] as well as the value of each platform's features); and (iii) a model that captures individual differences across publishers and that could reliably predict substitution to other platforms in the but-for world. In Section 4.3.1, I demonstrate how these shortcomings have a substantive effect on the estimation of damages for each publisher and render the model unreliable.

4.2.2. Dr. Schwartz assumes a common decline in proposed class members' revenue shares in the but-for world despite evidence of proposed class members' differentiated revenue shares in the real world

95. Beyond the differences in where and how they distribute their games, proposed class members also pay different effective revenue shares on Steam due to: (i) differences in their use of Steam keys; and (ii) differences in their qualification for Steam's additional revenue share tiers. In his model, Dr. Schwartz: (i) fails to account for the use of Steam keys in the as-is and but-for worlds; and (ii) fails to consider how the but-for world may impact Steam's tiered revenue shares. As I explain in this section, these failures lead Dr. Schwartz to erroneously assume common impact among proposed class members. In

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[107] Schwartz Report, ¶ 303 ("Specifically, Epic charges developers and publishers a commission rate of 12%, compared to Valve's 30%."); Tom Marks, "Report: Steam's 30% Cut Is Actually the Industry Standard," *IGN*, January 13, 2020, available at https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard, accessed on May 6, 2024 ("On the console side of things, the 30% baseline holds true. IGN was told this 30% also includes the licensing fees associated with publishing your game on each system. One source even explained that Nintendo used to take a 35% cut from games released as part of WiiWare, but has adjusted its policy since to be in line with its competitors.").

[108] ███

Section 4.3.2, I demonstrate that his underlying assumptions render his model unreliable for proving class-wide impact or estimating damages.

96.   **Dr. Schwartz's revenue shares and proposed harm.** As explained in Section 4.1, harm in Dr. Schwartz's damages model results from a difference between a game's as-is revenue share and but-for revenue share. Therefore, Dr. Schwartz needs an accurate estimate of a game's as-is revenue share and its but-for revenue share. Dr. Schwartz has neither, for two main reasons. First, the effective revenue share that any publisher pays to Steam depends on the extent to which that publisher uses Steam keys. Dr. Schwartz neither accounts for Steam keys in his model nor predicts how the use of Steam keys might change in the but-for world. Second, while Dr. Schwartz accounts for Steam's tiered revenue shares in the as-is world,[109] he does not predict whether those tiers would exist in a but-for world absent the alleged conduct, what the tiered revenue share rates would be, or whether they would be determined at the game level (as in the as-is world) or by publisher.[110]

97.   **Dr. Schwartz's analysis fails to account for the use of Steam keys in the as-is and but-for worlds.** As I explained in Section 3.1, publishers can request and sell Steam keys, and Valve does not take a share of revenue for sales that use Steam keys.[111] That is, Valve's revenue share on Steam key sales is zero. As a result, even if a product does not qualify for Steam's tiered revenue shares, its effective revenue share can be below 30 percent because of Steam keys. For example, if a publisher earns half of its revenues on Steam-enabled games sold on Steam with a 30 percent revenue share and the other half through sales of Steam keys outside of Steam with a 0 percent revenue share, its effective revenue share is only 15 percent. This is a second reason publishers' effective revenue shares vary in the as-is world and would vary in a way Dr. Schwartz's model cannot predict in the but-for world.

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[109]   Schwartz Report, ¶ 352 ("Valve has had a historic headline commission rate of 30% on sales of third-party PC content. From January 28, 2017 through December 31, 2022, Steam generated an effective commission rate of ██████, a rate that includes periods before and after the implementation of the tiered commission rate. For purposes of this analysis, I conclude that the ███ rate is a reasonable proxy for the effective market commission rate, given Steam's dominance in the marketplace; the effective market rate charged by Valve is what is relevant, rather than the specific rate paid by each publisher.").

[110]   As I discuss later in this section, Dr. Schwartz assumes that publishers will qualify for Steam's tiered revenue shares in the same way despite his prediction that Steam's market share will fall by roughly ██ percentage points.

[111]   Schwartz Report, footnote 827 ("As discussed in Section 3.3.5, there are instances in which users gain access to a game played through Steam through the acquisition of a Steam Key rather than the purchase of the game directly on Steam. In such instances, those purchases are not subject to the Valve commission charge.").

98.   Evidence in the record indicates that proposed class members vary widely in their use of Steam keys. Exhibit 1 displays the number of Steam key redemptions among Steam publishers versus those publishers' total revenues on Steam. As the exhibit shows, there is substantial variation in the number of Steam key redemptions among publishers, including very small and very large publishers. Proposed class members request Steam keys from Valve—and different amounts of them—for individualized reasons.[112] For example, users have redeemed many Steam keys for games published by Named Plaintiff Wolfire Games. By contrast, users have redeemed relatively fewer Steam keys for ██████ ████ games, and none at all for games published by ███████████ (even though its Steam revenues are ████████████[113] In general, some publishers may request few Steam keys while others may distribute copies of their games more broadly through Steam keys than through Steam itself, and this variation generates the cloud of dots in the exhibit.[114]

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[112]   There are also different types of Steam keys: Default Release ("appropriate for retail boxes or sales on other digital stores"), Release State Override ("intended for small beta tests and press/influencer access … It is never OK to sell Release-State Override keys"), and Developer Autogrant ("intended for developer use only"). See Steamworks, "Steam Keys," available at https://partner.steamgames.com/doc/features/keys, accessed on May 2, 2024.

[113]   ██████████ and ████████████ are publishers that distribute games through Steam.

[114]   Publishers may also vary in the degree to which they give out Steam keys to press, reviewers, and influencers. Steam keys provided to the press and influencers—or otherwise given away for free—effectively reduce the cost of publishers' marketing efforts. Reducing costs of generating publicity and thereby increasing demand increases publisher prices and reflects a transfer from Steam to the publisher. These transfers should be considered when analyzing a publisher's effective revenue share on Steam.

Exhibit 1
Publishers vary in their use of Steam keys
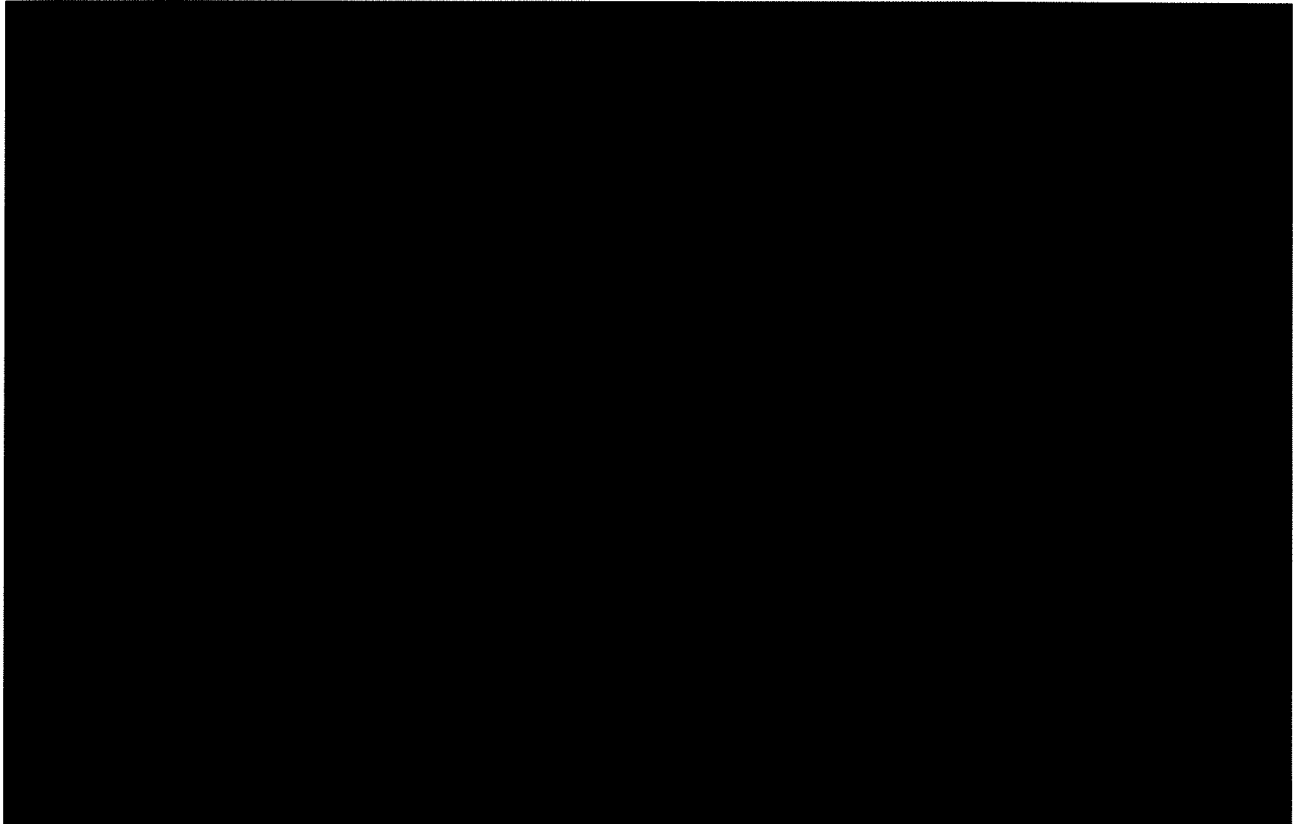
Source: *Schwartz Report and backup materials (Schwartz Analysis Data); Steam Key Redemptions Data*
Note:
The scale of both axes is logarithmic (values grow exponentially, not linearly). Each point represents a single publisher. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Total revenues on Steam are calculated as the sum of package and microtransaction revenues. There were ▮▮▮▮ publishers, represented by blue dots along the horizontal axis, that had no Steam key redemptions between January 28, 2017 and December 31, 2022. See Appendix C for a landscape orientation and a similar exhibit using Steam key issuances rather than redemptions.

99.   Accounting for the value of Steam keys is critical to calculating the effective revenue share paid by each proposed class member. Valve has information on the number of Steam key requests, the number of Steam key issuances, and the number of Steam key redemptions. However, Valve does not have any data on the number of Steam keys sold or the prices at which those Steam keys were sold because those sales occur outside of Steam. A proposed class member's effective revenue share depends on the revenues it generates from selling games on Steam (from which Valve takes its revenue share) and the revenues it generates outside of Steam through selling its games using keys (from which Valve takes

no revenue share).[115] Without this individualized information on each publisher's sale of Steam keys—information that could only be collected, if at all, by obtaining every publisher's sales records (assuming it maintains its Steam key sales data, which Named Plaintiff Wolfire Games did not)[116]—Dr. Schwartz cannot calculate accurate effective revenue shares for proposed class members.

100. To understand why accounting for Steam keys is important, consider again the publisher that earns half of its revenues on Steam and half through the sale of Steam keys outside of Steam. In a but-for world where Valve charges a lower headline revenue share to this publisher, that publisher may respond by using Steam keys: (i) equally (e.g., because enough of its audience remains on Steam); (ii) less (e.g., because it switches its efforts to selling on Steam from other stores, or because Steam becomes less generous in granting keys); or (iii) more (e.g., because Steam keys become more appealing). As a result, its effective revenue share may increase, decrease, or even stay the same in the but-for world. For example, if Valve were to drop its headline revenue share to 20 percent but stop giving out Steam keys in the but-for world, my example publisher earning half its revenues through Steam keys would be worse off (while other publishers that use fewer, or no, Steam keys may be better off). Because Dr. Schwartz's model hinges on the difference between as-is and but-for effective revenue shares to estimate harm, knowing how Steam key use will change in the but-for world is critical. However, without justification, Dr. Schwartz's damages model ignores Steam keys when calculating the effective revenue share publishers pay in the as-is and but-for worlds. The consequence is that his model assumes common harm but is incapable of proving it.

101. **Dr. Schwartz's analysis fails to consider how the but-for world may impact Steam's tiered revenue shares.** As I explained in Section 3.1, some publishers pay a smaller revenue share to Valve for specific games depending on each game's total sales up to that time. Evidence in the record suggests that Steam introduced its 2018 revenue share tiers partly in response to certain large publishers leaving its platform and to attract games that had never been sold on Steam.[117] The evolution of the revenue share tiers indicates

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[115]   In addition to missing data on the prices at which Steam keys sold, there may also be a discrepancy between the number of Steam keys *sold* versus the number of Steam keys *redeemed*.

[116]   30(b)(6) Deposition of David Rosen (Wolfire), November 30, 2023, pp. 182:23–183:3 ("Q. Does Wolfire have records, though, of how many customers at the point of purchase choose a DRM-free version versus a Steam key version when buying through Humble? Mr. Golden: Objection. Form. The Witness: Not that I know of.").

[117]   Steam gave additional revenue share to games selling over $10 million and $50 million on Steam in part to attract publishers that left the platform. This is evidence that there are differences in the price sensitivities of

that Steam's revenue share is game-specific in the real world, and that its revenue share in the but-for world is also likely to be individualized. The but-for world is unlikely to be one where Valve's revenue share of all publishers' sales of all games on Steam declines by a common factor. Nevertheless, Dr. Schwartz proposes exactly that methodology.[118]

102.   Intuitively, in Dr. Schwartz's but-for world, Steam's tiered revenue shares could be different or may not exist at all. In the real world, Valve adjusted the revenue shares it charged in response to specific games' substituting away from Steam. If Steam's market shares in the but-for world were to be as drastically different from the as-is world as Dr. Schwartz claims, it is reasonable to believe that Valve would consider whether the same tiered revenue share structure should apply. In fact, Dr. Schwartz's approach assumes that the tiers would be adjusted in the but-for world, but he assumes that they would adjust exactly proportionally to his assumed overall change in revenue shares.[119] There is nothing in his model to generate this result and no economic justification for why it might be true. Indeed, in a but-for world where Steam's average revenue share is far below 30 percent, it is unlikely that Steam would offer identical tiered revenue shares to the ones it offers now.[120]

103.   In addition, even supposing Steam were to adopt identical tiered revenue shares in Dr. Schwartz's but-for world, Dr. Schwartz has incorrectly modeled but-for revenue shares

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different publishers. Dr. Schwartz's model does not account for this fact of the industry. See 30(b)(6) Deposition of Scott Lynch (Valve), October 13, 2023, Exhibit 155 [VALVE_ANT_2392320 – 3 at VALVE_ANT_2392320] ("███ ").

[118]   Schwartz Report, ¶¶ 401–402.

[119]   This is a consequence of Dr. Schwartz's assumption of an aggregate scaling factor. For example, Dr. Schwartz predicts that publisher sales at a 30 percent as-is revenue share would pay a ███████████████) revenue share in the but-for world. Similarly, he predicts that publisher sales at a 25 percent as-is revenue share would pay a ██ ████████████ revenue share in the but-for world. Therefore, Dr. Schwartz's model implies that rather than the revenue share tiers stepping from 30 percent to 25 percent (in the as-is world), they step from ██ percent to ██ percent (in the but-for world). See Schwartz Report, ¶ 401 ("To determine the overcharge associated with a given commission rate, I scale the commission rates calculated in the transaction data by a ratio of the but-for commission rate to the overall effective commission rate in the damages period. The effective commission rate from Valve's transaction data is ████. The but-for commission rate I calculate above is 17.7% (see Section 8.3.5). Next, I multiply commissions paid to Valve by ████ to arrive at a but-for commission for a given commission rate.").

[120]   The change in tiers could impact whether a publisher is harmed at all. For example, games with over $50 million in Steam sales have an 80 percent revenue share with Valve retaining only 20 percent. In his damages model, Dr. Schwartz predicts that publishers' revenue shares will rise, and Valve's will fall, by about ██ percent in the but-for world. In a but-for world where Valve's headline revenue share is lower—say, 20 percent instead of 30 percent— a publisher would be no worse off between the as-is world and the but-for world for its game's revenues over $50 million on Steam.

for games that earned more than $10 million and qualified for an additional revenue share (i.e., a decline in the revenue share Valve retains) in the real world. In a but-for world where Steam's proposed market share falls by the ▮ percentage points he claims,[121] publishers would sell many more of their games on rival platforms. Therefore, many of the games that qualified for additional revenue share tiers in the real world would not have sold enough copies to have earned $10 million in revenue on Steam in the but-for world—and therefore, would never qualify for an additional revenue share in the but-for world.

104. **In sum, because Dr. Schwartz fails to model economic fundamentals—and instead uses contrary-to-fact assumptions about Steam keys and Valve's tiered revenue shares—to predict his but-for world, Dr. Schwartz cannot predict publishers' effective revenue shares in the but-for world.** Instead, he incorrectly assumes publishers would be impacted in a common manner, something his model cannot prove. In Section 4.3.2, I demonstrate how individualized changes in publishers' effective revenue shares— something that would surely happen in the but-for world—have substantial economic impact. I show that varying game-level effective revenue shares in Dr. Schwartz's model yields large differences in estimated damages for individual publishers. As such, variation in the effective revenue share—due either to Steam key use or different revenue share tiers—is important for estimating the damages each publisher might have suffered from the alleged conduct. Dr. Schwartz has not put forth a common methodology and does not have common evidence to determine Steam key use in the as-is or but-for worlds, and any change to Steam's additional revenue share tiers in the but-for world may also have substantial impact.

4.2.3.   Dr. Schwartz assumes, rather than demonstrates, that proposed class members would "pass through" changes in Steam's revenue share in a common fashion

105. The interaction between consumers and publishers (as intermediated by platforms) determines the rate at which publishers "pass through" changes in Valve's revenue share to customers in the form of game price changes. The pass-through rate is a core input into Dr. Schwartz's model because it determines the extent to which changes in platform revenue shares would be borne by publishers, rather than consumers. Dr. Schwartz's own

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[121]   Dr. Schwartz's proposed as-is and but-for world market shares for Steam are ▮ percent and ▮ percent, respectively. See Schwartz Report, ¶¶ 361 ("I use ▮ as Steam's real-world market share"), 376 ("However, because other factors likely also contribute to platform success, e.g., the user experience, social features, discovery tools, etc., I adopt Valve's ▮ share of revenues as Steam's but-for market share.").

method for estimating pass-through yields substantial variation in the pass-through rates across the small share of publishers for which he has data to estimate pass-through. This variation is to be expected given the substantial differences in consumers, games, and publishers. By contrast, Dr. Schwartz assumes that the pass-through rate is the same for all publishers on Steam because he lacks the necessary data to determine game-specific and publisher-specific pass-through for any proposed class members beyond the 124 games (or 0.14 percent of the more than 90,000 titles on Steam,[122] and corresponding to only 108 publishers) that he examined. As I show in Section 4.3.3, the degree of pass-through is quantitatively important for damages, and determining accurate pass-through rates for each game and publisher would require individualized inquiry.

106.   **Publishers' pass-through rates will differ across games due to variation in how consumers respond to game prices.** The pass-through rate in the video game industry is determined by the combination of how quickly consumers will substitute away from purchasing a game when the price rises and how much lower a price the publisher is willing to receive to continue selling a large number of games. If consumers continue purchasing the game as the price rises, then the pass-through rate will be relatively high, and cost increases will largely be passed on to consumers. If, on the other hand, consumers substitute to other games quickly as the price of a game rises, then the publisher may not be able to pass on cost increases without substantially impacting sales and profits.

107.   **In the video game industry, consumers vary in their preferences for games and likely vary in their responsiveness to game prices.** Different consumers like different video games.[123] Some consumers enjoy exploring fantasy worlds featuring familiar settings from their favorite book series. These consumers are willing to pay the higher prices typically associated with well-funded AAA games, such as the open-world action role-playing game *Hogwarts Legacy* that takes place in the *Harry Potter* universe.[124] In

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[122]   Steam currently hosts around 90,000 games. See Schwartz Report, ¶ 35. 124 ÷ 90,000 ≈ 0.14 percent.

[123]   Schwartz Report, ¶¶ 41, 65, 71, 80.

[124]   *Hogwarts Legacy* is a 2023 award-winning game published by Warner Bros. Games and developed by Avalanche Software. Taking place a century prior to the events in the *Harry Potter* novels, the player takes on the role of a student studying at Hogwarts who must uncover secrets threatening the wizarding world. Its budget was estimated to be $150 million, and its price on Steam is $59.99. See Vanessa Yurkevich, "Hogwarts Legacy Breaks Record Before Official Release, Despite Controversy," *CNN*, February 9, 2023, available at https://www.cnn.com/2023/02/09/tech/hogwarts-legacy-video-game-record/index.html, accessed on May 3, 2024; Steam, "Hogwarts Legacy," available at https://store.steampowered.com/app/990080/Hogwarts_Legacy/, accessed on May 7, 2024 ("Buy Hogwarts Legacy $59.99.").

contrast, some consumers might place less weight on immersive graphics and the ability to explore, and greater weight on other aspects of gameplay, like fast-paced action or the ability to play with friends. These consumers might be more interested in playing *Wizard with a Gun*, an indie multiplayer twin-stick shooter with no connection to the *Harry Potter* novels.[125] *Hogwarts Legacy* likely attracts different consumers than *Wizard with a Gun*, and its publisher likely faces different pricing incentives than *Wizard with a Gun*'s publisher.

108.   This variation in consumer preferences over game characteristics matters because it affects the prices that publishers would set for their games in Dr. Schwartz's but-for world. Because publishers cater to different consumers, they also face different incentives when pricing their games. Economists often use the term "price elasticity of demand" to describe the extent to which consumers will switch away from purchasing a product as the product's price rises.[126] Some publishers may enjoy a dedicated set of consumers who are likely to buy the game even at very high prices. These publishers can increase their prices without losing many consumers. Therefore, when their costs rise, these publishers will be able to increase their prices (i.e., "pass through" cost increases) to customers. Specifically, any potential increases in the revenue share Valve charges these customers could be entirely (or nearly entirely) reflected in changes in prices.[127] As a result, these publishers could experience little—if any—harm from any allegedly supracompetitive revenue share.[128]

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[125]   *Wizard with a Gun* is a 2023 online sandbox survival game published by Devolver Digital and developed by Galvanic Games. Playing as a wizard with a magical gun, the player wanders a magical wilderness collecting resources, customizing the character, and fighting monsters. Its price on Steam is $24.99. See Carli Velocci, "Wizard with a Gun Review," *IGN*, October 17, 2023, available at https://www.ign.com/articles/wizard-with-a-gun-review, accessed on May 3, 2024; Steam, "Wizard with a Gun," available at https://store.steampowered.com/app/1150530/Wizard_with_a_Gun/, accessed on May 7, 2024 ("Buy Wizard with a Gun $24.99.").

[126]   Robert S. Pindyck and Daniel L. Rubinfeld, *Microeconomics*, Eighth Edition, (Upper Saddle River: Pearson Education, 2013), p. 33 ("[T]he price elasticity of demand measures the sensitivity of quantity demanded to price changes. It tells us what the percentage change in the quantity demanded for a good will be following a 1-percent increase in the price of that good.").

[127]   The example I discuss is simplified and assumes away other factors that also affect the extent of pass-through. These include the elasticity of supply and competitive conditions. See E. Glen Weyl and Michael Fabinger, "Pass-Through as an Economic Tool: Principles of Incidence under Imperfect Competition," *Journal of Political Economy*, 121(3), 2013, pp. 528–583 at p. 535 ("The pass-through increases in the ratio of the elasticity of supply relative to that of demand."); B. Douglas Bernheim and Michael Whinston, *Microeconomics*, (New York: McGraw-Hill/Irwin, 2008), p. 641 ("In a perfectly competitive market, the pass-through rate is never greater than one. In comparison, the monopolist's pass-through rate depends on the shape of the demand curve.").

[128]   The degree to which a publisher might still be harmed would depend on the level of pass-through and whether higher prices caused consumers to forego purchases of the publisher's product.

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109.   In contrast, other publishers face highly price-sensitive consumers who will choose not to purchase a game if the price increases by even a small amount. These publishers will not be able to "pass through" cost increases to consumers through higher prices without losing substantial sales, and they would therefore suffer more harm from allegedly supracompetitive pricing on Steam. It is not possible to establish to what extent, if at all, each proposed class member was damaged due to Valve's allegedly supracompetitive revenue share without knowing the price elasticity of demand each publisher faces for each game.[129]

110.   **Dr. Schwartz ignores that publishers have more power to raise prices on some games than others.** Contrary to reality, Dr. Schwartz assumes there are no differences across consumers and no differences in publishers' pricing incentives for their games.[130] **First, Dr. Schwartz assumes that all consumers respond identically to changes in prices regardless of the product they purchase or their own preferences.[131] Second, in Dr. Schwartz's world, all publishers have the same pricing incentives since they face the same "faceless" consumers.** For example, consider Warner Bros. Games, the publisher of *Hogwarts Legacy*. Warner Bros. Games is the only gaming company with the rights to bring author J.K. Rowling's *Harry Potter* novel series to video games.[132] When it released *Hogwarts Legacy* in February 2023, fans put a collective 267 million hours into the game

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[129]   Indeed, Dr. Schwartz acknowledges that pass-through rates "can range widely" and can be affected by "the slope of the demand curve" and "other real-world market considerations, such as network effects." See Schwartz Report, ¶ 382.

[130]   Dr. Schwartz's pass-through estimates do not come from and are not integrated into his damages model. In fact, Dr. Schwartz's damages model cannot address pass-through because it does not model publisher's pricing choices. In addition, modeling publisher pricing (and pass-through) would necessitate modeling consumer behavior which is not captured in Dr. Schwartz's model. To reliably predict publisher pricing and pass-through, Dr. Schwartz would need to model how consumers would respond to any changes in prices.

[131]   Technically, the assumption is that all games have the same relative supply and demand elasticities such that pass-through rates are identical. This is because there is only a single price parameter for Steam in the Landes and Posner model outlined in Section 8.2 in Dr. Schwartz's Report.

[132]   Warner Bros. first acquired the rights to the *Harry Potter* franchise in 1997. It currently publishes video games related to the *Harry Potter* universe under the label Portkey Games. See Erich Schwartzel, "Can Warner Bros. Uncancel J.K. Rowling?" *The Wall Street Journal*, February 24, 2024, available at https://www.wsj.com/business/media/jk-rowling-harry-potter-warner-bros-tv-ba66a767, accessed on May 5, 2024 ("Warner Bros. was early to the Harry Potter phenomenon. The studio secured the rights to adapt the series after an eagle-eyed producer, David Heyman, read the unpublished manuscript of Rowling's debut novel, released in the U.K. as 'Harry Potter and the Philosopher's Stone.' Heyman took the idea to Warner Bros in early 1997. Rowling wasn't paid an impressive amount for the deal, whose terms gave the studio vast creative control over the property, reflecting her status as an unproven literary talent."); Portkey Games, "Portkey Games," available at https://www.portkeygames.com/, accessed on May 5, 2024 ("Portkey Games, from Warner Bros. Games, is the games label dedicated to creating new Wizarding World mobile and videogame experiences that place the player at the centre of their own adventure, inspired by J.K. Rowling's original stories ... WIZARDING WORLD characters, names and related indicia are trademarks of and © Warner Bros. Ent. All rights reserved.").

in under three weeks.[133] Contrast Warner Bros. Games' incentives with Devolver Digital's, the publisher of *Wizard with a Gun*. Whereas *Hogwarts Legacy* draws on a base of dedicated *Harry Potter* fans willing to pay high prices to experience an immersive adventure in a unique fictional universe, *Wizard with a Gun* caters to a broader and more casual audience that has many alternative options for faced-paced, multiplayer shooter games. As a result, Warner Bros. Games may be able to pass on cost increases to consumers in the form of higher prices with minimal loss to overall sales, whereas Devolver Digital may lose many customers if it made a similar price change. However, Dr. Schwartz's model assumes that both publishers would view their audiences as equally likely to forego a purchase in the face of a similar price increase—a clear departure from reality.

111.   **Dr. Schwartz acknowledges that pass-through matters for damages.** Dr. Schwartz acknowledges that the differences between games like *Hogwarts Legacy* and *Wizard with a Gun* give their developers different incentives, and that those differences can result in differences in pass-through rates across publishers and developers.[134] Yet he chooses to ignore these differences in his model. As a result, his model is methodologically incapable of capturing realistic differences in publishers' responses to changes in Steam's revenue shares in his but-for world.[135] These differences in pass-through rates across publishers and developers are critical for proving the impact of the alleged conduct and the extent, if any, to which each proposed class member may have been harmed by that conduct.

112.   For example, suppose Warner Bros. Games in the as-is world passes through all of Valve's effective revenue share onto Steam prices for *Hogwarts Legacy*.[136] Then, in the but-for world in Dr. Schwartz's model where the revenue share falls, Warner Bros. Games should be no better off and unharmed by the alleged conduct—it continues to pass through the

[133]   Hope Bellingham, "The Hogwarts Legacy Community is Collectively Playing 23 Million Hours a Day," *GamesRadar+*, February 23, 2023, available at https://www.gamesradar.com/the-hogwarts-legacy-community-is-collectively-playing-23-million-hours-a-day/, accessed on May 6, 2024.

[134]   Schwartz Report, ¶¶ 382–383.

[135]   Dr. Schwartz does not model pass-through as something that depends on, for example, the differential demand for publishers' games or the conditions outlined in ¶¶ 382–383 of his report. As I explain, he instead estimates pass-through for a subset of games and applies this estimate to all games and all publishers in his model. See Schwartz Report, ¶ 397, Figure 9.

[136]   This example might be realistic for many publishers. For example, Named Plaintiff Wolfire Games testified that any "commission rate savings" would get "passed through to customers." See 30(b)(6) Deposition of David Rosen (Wolfire), November 30, 2023, pp. 265:17–266:3 ("Q. What is the pricing experiment you're referring to? A. Passing on all of the savings from various commission rates on to customers. Q. Would Wolfire, in that scenario, keep any of the, as you put it, commission rate savings? Mr. Golden: Objection to form. The Witness: No. By Mr. Skok: Q. It would all get passed through to customers? A. Yes.").

change in revenue share onto consumer prices.[137] However, Dr. Schwartz assumes Warner Bros. Games would pass through only 20 to 25 percent of the change in revenue share. At the other extreme, a publisher might not change its Steam prices at all in the face of a change in the effective revenue share it pays Valve. This publisher would keep the entirety of the cost savings (not "pass through" any), and, in Dr. Schwartz's model, should be much better off in the but-for world. However, Dr. Schwartz would again assume a 20 to 25 percent pass-through rate, reducing the profits to this publisher.

113. **Dr. Schwartz assumes a common pass-through rate despite his estimates to the contrary.** In his damages model, Dr. Schwartz assumes a common (i.e., identical) pass-through rate for all developers and all publishers and all games.[138] As a result, Dr. Schwartz's proposed methodology cannot reliably identify alleged harm to individual proposed class members using common proof; establishing harm requires individualized inquiry into differences that lead to different pass-through rates.

114. Indeed, Dr. Schwartz's own empirical analysis yields differences in pass-through rates between publishers' revenue shares and their game prices. Exhibit 2 depicts Dr. Schwartz's pass-through rate for each game in the sample of 124 games that he analyzes. Supposing Dr. Schwartz's assumption that all price changes shown were due solely to pass-through of cost savings was correct and that his empirical approach yielded reliable estimates of pass-through,[139] 36 percent of his sample of games do not pass through any cost savings at all (or have negative pass-through), 23 percent pass through 100 percent or more cost savings, and 41 percent pass through somewhere in between.[140] The 23 percent of games with 100 percent or more pass-through would not generate harm under Dr. Schwartz's damages approach if he were to use individualized pass-through rates. In fact, only four games in Dr. Schwartz's sample of 124 games (approximately 3.2 percent

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[137]   Schwartz Report, ¶ 379 ("Unless game publishers pass-through 100% (or more) of the commission savings … game publishers will suffer *some* injury from the inflated commission rates, that is, the overcharge."). Changes in quantities might also affect profits. Dr. Schwartz assumes quantities do not change between his as-is and but-for worlds. See Schwartz Report, ¶ 405 ("This calculation does not consider the change in quantity of sales as a result of the lower commission rate (and resulting lower consumer price).").

[138]   Dr. Schwartz initially estimates pass-through at the package level, but he aggregates these package level figures when estimating consumer price reduction. See Schwartz Report, ¶¶ 396–397 ("The median price change values in the samples above range from ███████████ implying pass-through rates of approximately 20% to 25% The pass-through rate of 20% to 25% on the but-for commission rate would imply an approximately ███████ consumer price reduction.").

[139]   For the avoidance of doubt, I do not endorse Dr. Schwartz's methodology to estimate pass-through as reliable.

[140]   Workpaper 1.

of those games) actually had a pass-through rate between the 20 percent and 25 percent that Dr. Schwartz asserts applies class-wide.[141]

Exhibit 2

Dr. Schwartz estimates substantial variance in games' pass-through rates
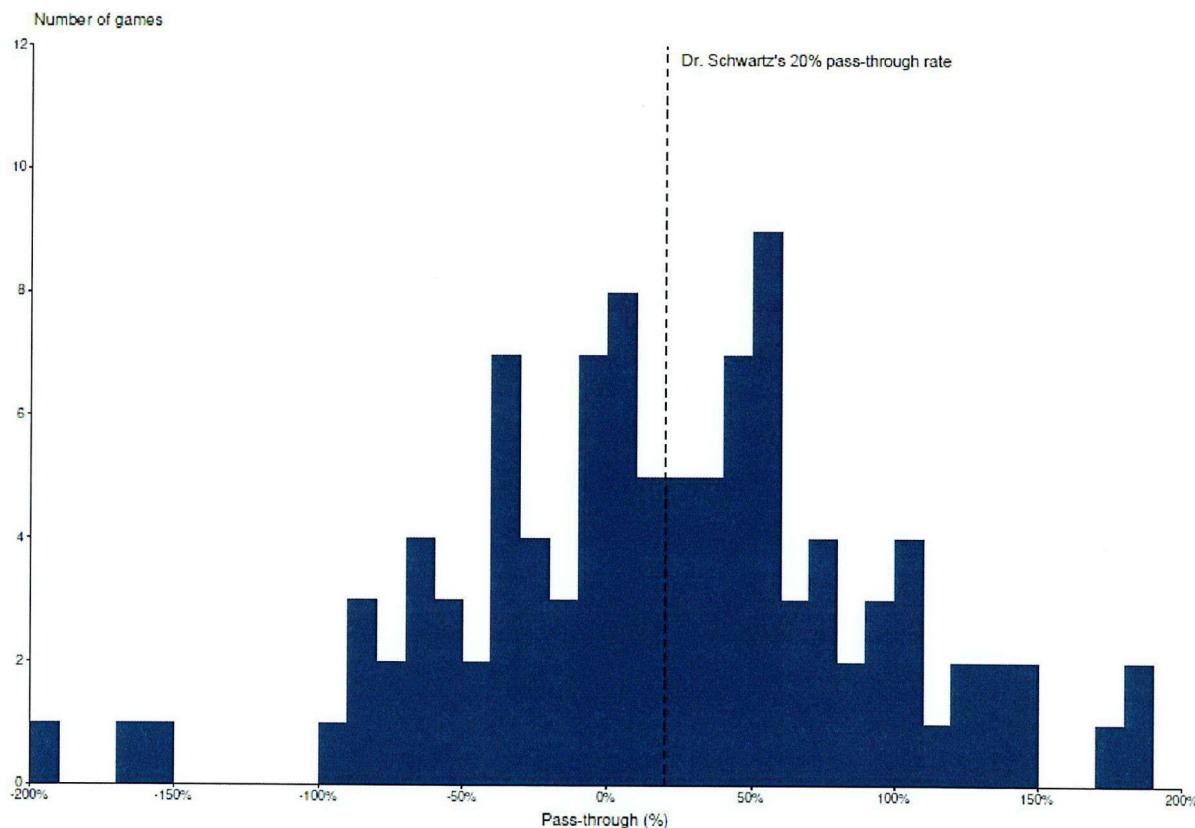
Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Passthrough)
Note:
This figure presents Dr. Schwartz's estimated pass-through rates. Dr. Schwartz estimates pass-through rates for 124 games that qualified for a reduced revenue share of 25 percent, did not subsequently qualify for a reduced revenue share of 20 percent, had revenues from at least 360 days before to 360 days after the revenue share change, and had pricing and transaction data available for at least 50 percent of the days in that 720-day window. See Schwartz Report, ¶¶ 392–394. Six games with pass-through rates lower than -200 percent and 14 games with pass-through rates higher than 200 percent are excluded from this exhibit.

115. **Dr. Schwartz's model does not and cannot account for game-level variation in pass-through.** Despite these differences, Dr. Schwartz: (i) does not put forth a common methodology to estimate pass-through for each developer, publisher, and game; and (ii)

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141   Workpaper 1.

does not put forth a common methodology to disentangle the individualized contracts between publishers and developers that would impact the share of revenues that are not passed through to consumers.

116.   First, Dr. Schwartz's methodology to estimate pass-through cannot be used to estimate pass-through for each developer, publisher, and game. To estimate pass-through, Dr. Schwartz uses past data on changes in the revenue shares publishers have paid to Valve. He identifies the introduction of Steam's additional revenue share tiers in 2018 as the "only systematic change in Steam's [revenue share]."[142] He merely observes the prices publishers charged for a sample of 124 games one year before and one year after the game qualified for an additional revenue share when reaching $10 million in sales.[143] Dr. Schwartz assumes that all publishers of all games would pass through their savings from their higher 75 percent revenue share (and Valve's correspondingly lower 25 percent) onto consumer prices the same way as the median publisher of these 124 games did,[144] an assumption inconsistent with the observable variation within those 124 games.[145] He has not put forth any methodology to estimate the pass-through rate of the remaining 99+ percent of games sold on Steam. He has proposed no class-wide methodology.

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[142]   Schwartz Report, ¶ 392.

[143]   In addition to the other shortcomings of this approach I lay out in this section, Dr. Schwartz also assumes that the price changes for games in his sample are due exclusively to qualifying for a higher revenue share—that is, he assumes causality without controlling for other possible influencing factors such as the age of a game. Game age matters because game prices tend to fall over time. See Deposition of ███████████████████████████ ████████████████, p. 51:1–3. Dr. Schwartz may attribute a natural decline in a game's price over time to a change in its revenue share. In fact, Dr. Schwartz excludes games early in their release (which are unlikely to change prices), which may bias him toward finding non-zero pass-through. See Schwartz Report, ¶ 393. Further, by studying only the games that qualified for Steam's tiered revenue shares, Dr. Schwartz ignores all small games. It is unlikely that the pass-through rates for small games are similar to those of popular games. It may also be that pass-through differs by type of transaction (e.g., base games versus downloadable content versus in-app purchases). See, e.g., Schwartz Deposition, pp. 226:25–227:7 ("Q. Is that group of one hundred twenty-four games a representative sample of the games that are sold on Steam? A. I think it is surely not representative of the games that never achieved that level of sales and therefore never benefitted from a price change.").

[144]   Dr. Schwartz calculates the median percentage price change across all 124 games, as well as the median price change in five sub-samples of those games. He uses the largest of these median price changes (negative ███ percent) to calculate his maximum pass-through rate of 25 percent, and the smallest of these median price changes (negative ███ percent) to calculate his minimum pass-through rate of 20 percent. See Schwartz Report, ¶¶ 394–396 ("I use the median as a sample statistic since it is less susceptible to extreme outlier influence. To examine the potential impact of outliers, I recalculate the average and median price reductions excluding games from the sample where the magnitude of the percentage price reduction is at least 10% in absolute value (i.e., less than or equal to -10% or greater than or equal to 10%). I then repeat this process using threshold values of 15%, 20%, 25%, and 30%, calculating the average and median price reductions in each instance ... The median price change values in the samples above range from ████████████ implying pass-through rates of approximately 20% to 25%.").

[145]   As I discuss in Section 4.3.3, pricing video games is a complex process involving many factors, which Dr. Schwartz fails to consider when making this overly simplistic assumption regarding publishers' pass-through of potential savings.

117.   Second, Dr. Schwartz does not propose a methodology to capture the important differences in the relationships and contracts between publishers and developers that include splits of revenue between them. For example, academic literature reports that 45 percent of games on Steam are developed by an entity that is different from their publisher.[146] A newer indie developer working with an established publisher may not have much bargaining power when negotiating their contract, whereas an established, successful developer may be able to choose between multiple potential publishers and negotiate a better contract. The difference in these contracts may yield different payouts with respect to changes in the revenue share. For example, the developer with relatively less ability to bargain may receive *no* benefit from any increase in profits due to a higher but-for revenue share (and lower share for Valve), whereas the developer with relatively more ability to bargain may receive the *full* benefit from any increase in profits due to a higher but-for revenue share (and lower share for Valve). In the first case, there would be no harm to the developer (but there would be for the publisher), and in the second case there would be harm to the developer (but no harm to the publisher). In fact, it may even be that different parties have different rights to set prices. Therefore, over and above Dr. Schwartz's inability to determine how any proposed damages would be split between publisher and consumer due to pass-through, it would require individualized inquiry into developer-publisher contracts to determine how any proposed damages would be split between a given publisher and developer.

118.   **In sum, pass-through is important for the estimation of damages, and Dr. Schwartz has not proposed a reliable methodology to estimate pass-through for all games.** In Section 4.3.3, I demonstrate that the above flaws have substantial economic impact, rendering his model unreliable. I show that using alternative, individualized, game-level pass-through rates drawn from the 124 games in Dr. Schwartz's sample yields large differences in estimated damages. Accounting for variation in pass-through—both across publishers and across developers that contract with publishers—is critical to any analysis of damages. Dr. Schwartz has not put forth a common methodology and does not have common evidence to determine these individualized circumstances.

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[146]   José Tudón, "Distilling Network Effects from Steam," *Quantitative Marketing and Economics*, 20, 2022, pp. 293–312 at p. 297 ("The data features 9,085 different games. The average price on the market is 11, games have an average rating of 72 'likes' out of 100, 24% of games have a multiplayer mode, and 45% of games are developed by a different entity than their publisher.").

4.2.4.   *Dr. Schwartz ignores network effects and the two-sided nature of distribution platforms and instead assumes a but-for world dependent upon arbitrary assumptions*

119.   The importance of platforms in providing a meeting place for consumers and publishers makes the interaction between consumers, publishers, and platforms critical to understanding damages in this matter. By modeling the industry as "one sided," Dr. Schwartz ignores that some of the value of platforms comes from building and maintaining a base of consumers and publishers. These "network effects" mean that, everything else equal, a consumer is more likely to get more value out of a platform that has a large number of publishers and other consumers, and a publisher is more likely to get more value out of a platform with a large number of consumers and other publishers.

120.   **Dr. Schwartz's damages model ignores the value of building and maintaining a quality product that appeals to both sides of these sales.** Dr. Schwartz also does not model how the removal of the alleged PMFN would influence Steam's and other distribution platforms' incentive to change the quality of their product and how consumers and publishers would react to these changes. In fact, he does not specify the existence or size of rival distribution platforms in the but-for world. In his report, Dr. Schwartz is clear that he models "the but-for market shares for Valve as well as the publishers that engaged in digital PC game distribution based on the relative success of their games on Steam."[147] However, in deposition, Dr. Schwartz testified he does not know the but-for market shares of non-Steam platforms.[148] In either case, Dr. Schwartz's proposed but-for market is unrealistic for at least two reasons.

121.   First, Dr. Schwartz's methodology to determine but-for market shares rests on an unmodeled and empirically unsupported assumption that publisher market shares on Steam are a good approximation of but-for platform market shares a decade later.

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[147]   Schwartz Report, ¶ 374. See also Schwartz Report, Figure 6.

[148]   Schwartz Deposition, pp. 99:21–100:8 ("Q. Do you believe that in the but-for world, ███ will operate a platform with a market share of ███ percent between 2017 and 2021? A. I don't know and I don't need to know. It doesn't -- what I need to know is what the but-for -- approximate but-for market share is for Valve who comprises the remaining roughly ███ percent of the market and how that's distributed across the various platforms is not an essential element of my analysis."). 100:18–101:7 ("Q. So you're saying, for example, that ███ share could be higher than ███ percent and ███ share could be lower than ███ percent? A. What I'm saying is that there will be other platforms that will comprise the ███ percent of the rest of the market. Whether it is comprised of ███ only, whether it will be some subset of this group plus others who may have entered and failed or thought about entering and chose not to is not what is important."). 109:7–17 ("A. ... I don't know nor do I need to know what ███████████████████ do in the but-for world. I don't need to know whether any of them would have had some form of distribution. All I need to know is that all the remaining competitors would have about ███ percent of the market, ███ How that's allocated I don't know.").

Specifically, Dr. Schwartz proposes that the but-for market shares for eight firms—or at least Valve, according to his deposition testimony—can be reliably approximated by their relative sales of their own games on Steam between 2008 and 2012.[149] For example, ██ share of these eight publishers' sales of its own games on Steam was ██ percent during this period, Activision's was ██ percent, and so on, with the seven besides Steam adding up to ██ percent.[150] Dr. Schwartz assumes other firms would operate distribution platforms and achieve the same ██ percent share of the proposed market in the but-for world all the way to the present day.[151] However, there is no reason to believe that publishers' market shares, based on sales of their own games, are a good proxy for distribution platform market shares for sales of many publishers' games—let alone a decade later. Further, this proposed methodology does not explain—per his deposition testimony—any process by which Valve's competitors as publishers would consolidate or fragment to result in a combined but-for market share of ██ percent.[152] Yet somehow, Dr. Schwartz assumes that the same methodology reliably predicts Valve's steady but-for market share of ██ percent.

122.   Second, Dr. Schwartz is unlikely to correctly predict but-for market shares by ignoring documented network effects in the industry. The economic literature finds that digital industries are characterized by high fixed costs (e.g., it is expensive to set up a successful platform with a sufficient consumer and publisher base that entices other consumers and

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[149]   Schwartz Deposition, pp. 103:6–104:23 ("Q. … The revenue shares that you derive in figure six in the right-hand column, ██ Valve, ████████, those are all simply derived by comparing the Steam revenue that's listed in the Steam revenue chart on figure six; correct? A. It is based on the revenue from the Steam platform on the sale of the games during this period and -- during this five-year period, and that's the best predictor we have for what Valve's market share would be in a but-for world. That's the only parameter I need for the damages analysis. The specifics about how the remaining share is divided up in the but-for world is not something that I need for my damages analysis or any other part of my analysis. Q. Your basis for thinking that Steam will have a ██ percent revenue share in the but-for world is because its sales on figure six between January, 2008 and December, 2012 was ████████; correct? A. ████████████████. Q. I'm sorry. Let me rephrase that. Your basis for thinking that Steam's revenue share of ██ percent will be because Valve's sales of its own games on Steam between January, 2008 and December, 2012 were ████████; correct? The Witness: Read that one back to me again, please … I would agree that's how the calculation is done.").

[150]   Schwartz Report, Figure 6.

[151]   Technically, each firm's market share is its share of revenues among the set of eight firms he chooses. See Schwartz Report, ¶ 374 ("I thus model the but-for market shares for Valve as well as the publishers that engaged in digital PC game distribution based on the relative success of their games on Steam. To quantify the success of publishers' games, I use a given publisher's share of revenues on Steam among the publishers that have attempted to create distribution platforms as a proxy for the market share of their platforms in the but-for world."). However, in deposition, Dr. Schwartz claimed he did not know the market shares of the non-Valve firms. See Schwartz Deposition, pp. 99:21–100:8, 100:18–101:7, 109:7–17.

[152]   Schwartz Deposition, pp. 99:21–100:8, 100:18–101:7, 109:7–17.

publishers to use the platform).[153] Dr. Schwartz does not model or provide an empirical (i.e., data-based) justification or support for the relative sizes of Steam's but-for competitors, instead basing them on publishers' shares on Steam. Network effects are important to distribution platforms, yet they are not necessarily important to a publisher's portfolio of games—that is, publishers care about network effects on the platform where they sell their games, but they do not necessarily worry about getting big in order to create their own network effects.[154] In the remainder of this section, I explain the importance of network effects in two-sided markets and how Dr. Schwartz's damages model is unreliable for ignoring them.

123. **Video game distributors are canonical two-sided platforms.** As discussed in Section 3.2, Rochet and Tirole (2003, 2006)—to which Dr. Schwartz cites[155]—start their discussion of two-sided markets with the example of video games.[156] As the authors note, "two-sided markets differ from the textbook treatment of multiproduct oligopoly or monopoly."[157] That is, the literature that Dr. Schwartz cites explains that two-sided markets, with video games as an example, require a different treatment than do traditional (one-sided) models for market power and monopoly.[158] Dr. Schwartz (as well as Prof. Joost Rietveld)

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[153]   Carl Shapiro and Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy*, (Boston: Harvard Business School Press, 1999 at p. 3 ("Economists say that production of an information good involves high fixed costs."); Hal R. Varian, Joseph Farrell, and Carl Shapiro, *The Economics of Information Technology: An Introduction*, (Cambridge: Cambridge University Press, 2004), p. 25 ("[M]any information- and technology-related businesses have cost structures with large fixed costs"); Paul A. Samuelson and William D. Nordhaus, *Economics*, Nineteenth Edition, (New York: McGraw Hill, 2009), p. 128 ("[Information technology] typically has the property that it is very costly to produce the first copy and very cheap to produce subsequent copies."). Dr. Schwartz also characterizes developing a distribution platform as "costly" and that it is "difficult … to entice gamers to move to a standalone platform and likely impossible, as a practical matter, for multiple game publishers to accomplish that." See Schwartz Report, ¶¶ 79–80.

[154]   Academic literature—specifically the literature that Dr. Schwartz cites—highlights the role of network effects in video game distribution. See Rochet and Tirole (2003), pp. 990 ("Many if not most markets with network externalities are two-sided. Buyers of video game consoles want games to play on; game developers pick platforms that are or will be popular among gamers."), 1015 ("The video game market is a typical two-sided one."). See also, for network effects on Steam specifically, José Tudón, "Distilling Network Effects from Steam," *Quantitative Marketing and Economics*, 20, 2022, pp. 293–312 at pp. 293 ("I estimate demand for video games as a function of individuals' social networks, prices, and qualities, using data from Steam, the largest video game digital distributor in the world."), 295 ("The results suggest the presence of strong network externalities: if the proportion of friends with some game j increases by 1%, then the demand for game j increases by .13%."). In contrast, neither the literature Dr. Schwartz cites (Rochet and Tirole (2003, 2006)) nor Tudón (2022) highlights video game publishers as platforms or characterizes strong network effects publishers face.

[155]   See, e.g., Schwartz Report, ¶¶ 335, 338.

[156]   Rochet and Tirole (2003); Rochet and Tirole (2006).

[157]   Rochet and Tirole (2003), p. 991.

[158]   For example, the two-sided market literature has long recognized that analyzing prices on one side only can yield false predictions about market power. See David Evans and Richard Schmalensee, "The Antitrust Analysis of Multisided Platform Businesses," in *The Oxford Handbook of International Antitrust Economics*, eds. Roger D. Blair and D. Daniel Sokol, (New York: Oxford University Press, 2014), pp. 404–448 at p. 430 ("Several authors have warned

acknowledges that Steam is a two-sided platform.[159] He also acknowledges that two-sided platforms are characterized by both direct network effects and indirect network effects.[160] Yet he models Steam as one-sided instead.

124.   **By modeling the industry as "one sided," Dr. Schwartz ignores that some of the value of platforms comes from connecting game publishers and consumers, and that this value is enhanced by building and maintaining a base of consumers and publishers.** There is no evidence that ignoring network effects, as Dr. Schwartz does, provides a reliable approximation of the PC video game distribution industry, especially in the context of Dr. Schwartz's radically different but-for world.

125.   To better understand the problems with treating video game platforms as one-sided, consider a manufacturing firm that makes butter, which can be thought of as a one-sided platform: the firm (the "platform") chooses workers' wages on one side without direct consideration for the product prices it charges consumers on the other.[161] However, the firm is one-sided because consumers looking to buy butter do not benefit from the existence of other butter consumers, nor do they benefit indirectly from more workers at the butter manufacturing plant. Similarly, workers at the butter plant do not benefit from additional workers or from additional consumers of butter. This means that, when setting prices (or agreeing to wages), the firm does not need to consider the effect of one

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against basing judgments about market power on analysis of only a single side of a multisided platform (Argentesi and Filistrucchi 2007; Evans 2003b; Song 2013; Weyl 2010; Wright 2004) … Therefore examining price on that side would result in a false negative test result for market power. A platform could also earn a competitive rate of return yet price significantly above marginal cost on one side. Therefore examining price on that side would result in a false positive test result for market power."). Relatedly, Rochet and Tirole acknowledge the presence of cross-subsidization in various two-sided industries including video games. See Rochet and Tirole (2003), Table 1 ("Product; Video games; subsidized segment: consumers, subsidizing segment: software developers"), p. 1016 ("The streaming-media industry is still in its infancy and it is probably too early to point at "the" business model. The current business mostly, but not exclusively, subsidizes the client side.").

[159]   Schwartz Report, ¶¶ 30 ("[P]latforms such as Steam, that connect two or more different groups of users in a physical or virtual space are called two-sided or multi-sided platforms."), 57 ("Steam is a two-sided platform"), 58 ("[T]here are two sides to the market, married by a simultaneous purchase and sale of a good (a game)."); Deposition of Joost Rietveld, April 17, 2024, pp. 24:24–25:21 ("Q. And is the video game industry characterized by two-sided market participants?... A. There are segments of the gaming industry that are two-sided markets for sure. Q. And can you identify some of those? A. So console gaming, at markets, and also some PC distribution platforms. Q. Can you identify some platforms in each of these categories? A. … And PC distribution, Valve's Steam would be a good example.").

[160]   Schwartz Report, ¶ 30 ("Platforms often exhibit network effects. Economists define network effects as an attribute of a product or platform, in which the product or platform's value changes as the number of users of that product or platform changes. 'Direct' or 'same-side' network effects exist if, as more users join a platform, the value of that platform increases to all users on that same side of the platform. 'Indirect' or 'cross-side' network effects exist if, as more users of a different group join a platform, the value of the platform increases to the first group of users."), ¶ 80 ("Users want access to the platforms that have the most games and other users.").

[161]   Rochet and Tirole (2006), pp. 648–649.

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additional customer on the value that all of the other customers get from the firm (or how one additional worker affects the value other workers get from their jobs). Therefore, when such a firm maximizes its profits, it does not take into account the network effects that characterize two-sided platforms. A model that characterizes how the butter manufacturer sets prices would likely inaccurately represent how a two-sided platform sets prices.

126.   By contrast, a video game distribution platform is much closer to a credit or debit card network. Consider a proprietary card network like American Express or Discover.[162] These cards facilitate sales between consumers and merchants (like gamers and publishers). Consumers are better off if more merchants accept their cards, and merchants are better off if the cards they accept bring in more consumer purchases. To maximize profits, these card companies need to do more than trade off the profits they get from increasing fees against the benefit they get from expanding the network. They also need to consider the benefits of charging one side versus the other, for example, the balance of higher annual charges to consumers versus higher transaction fees to merchants.[163] As cards charge less to cardholders and more to merchants, there will be increased card holding but fewer merchants willing to accept cards, which will undermine cardholders' incentive to have the card. Video game distribution platforms consider similar incentives and seek to balance these costs and benefits to grow their platforms.

127.   Nevertheless, Dr. Schwartz assumes that video game distribution platforms can be modeled as "one-sided" rather than "two-sided" markets.[164] He bases this assumption on the condition that it does not matter how Steam chooses to price on either side of the platform, it only matters what Steam charges both sides of the platform in total.[165] Said differently, Dr. Schwartz's assumption rests on the condition that the number of sales

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[162]   See, e.g., Julian Wright, "One-Sided Logic in Two-Sided Markets," *Review of Network Economics*, 3(1), 2004, pp. 44–64, which discusses the problems of applying one-sided logic in two-sided markets like credit and debit cards. The case of proprietary cards is more straightforward than card associations such as MasterCard or Visa, which involve card associations where member banks and other financial institutions deal directly with cardholders.

[163]   Both total fees and the structure of fees (relative amounts paid by the merchant and cardholder) influence the number of sales on credit card networks. The price structure is not neutral because there exists a "constraint put by the platform on the pricing of transactions between end-users." See Rochet and Tirole (2006), p. 650 ("Factors of nonneutrality under usage pricing ... Prohibition or constraint put by the platform on the pricing of transactions between end-users... A prominent case in point is a no-surcharge rule imposed by a payment system (the merchant's price must be the same whether the customer uses cash or a card).").

[164]   Schwartz Report, ¶¶ 336–337, 340.

[165]   Schwartz Report, ¶ 336 ("A key feature of Rochet and Tirole (2006)—and the one that makes my analytic approach appropriate for analyzing a platform such as Steam—is that a market is defined as one-sided if the quantity of transactions depends *only* on price level and not price structure across the two sides.").

would not change if Steam instead started charging consumers a 30 percent fee for buying games and developers a 0 percent revenue share for selling them (rather than its current zero charge to consumers and 30 percent headline rate for most developers).[166]

128.   Dr. Schwartz's contention stands in stark contrast to: (i) his admission of network effects and that Steam is a two-sided platform; and (ii) the fact that video game platforms are canonically treated as two-sided by the academic literature (including the articles he cites to support his decision to model Steam as a one-sided platform). He has provided no empirical evidence that, for example, a 15 percent charge to consumers and a 15 percent charge to publishers would result in the same number of transactions as a 30 percent charge to publishers. Nevertheless, he analyzes Steam as if that proposition were true.

129.   Dr. Schwartz's claim that the revenue share structure does not matter rests on the assumption that publishers could pass through any change in revenue shares onto consumer prices.[167] Dr. Schwartz justifies this decision based on a misreading of the academic literature and a mischaracterization of the industry.[168] Dr. Schwartz's decision to analyze Steam as a one-sided platform hinges on the condition that "volume-insensitive costs" "influenced by the platform" do not exist on Steam.[169] However, **the same article Dr. Schwartz relies on to justify his decision to model Steam as a one-sided platform also explicitly states that this core condition does not hold for video game platforms.** Specifically, the article highlights the video game industry where both sides (users and developers/publishers) incur "volume insensitive costs" that are "influenced by the platform" such as "getting familiar with the platform's user interface" (consumers) or the "fixed development cost" of a game (publishers and developers).[170] Dr. Schwartz

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[166]   To keep the percentage charge the same to the publisher-side charge, the equivalent consumer-side percentage charge needs to be defined not on the price of the product but on the price of the product including any consumer charges. For example, to be equivalent to a 30 percent revenue share paid by publishers, the consumer-side 30 percent charge would need to be defined on the final amounts the consumer pays including amounts paid to Steam.

[167]   Schwartz Report, ¶¶ 336, 338. This is the crux of Dr. Schwartz's citations to Rochet and Tirole (2003) and Rochet and Tirole (2006) regarding price neutrality. Price structure neutrality requires, among other conditions, the "Lack of constraints on pass-through." See Schwartz Report, ¶ 338.

[168]   Dr. Schwartz argues that he can model Steam as a one-sided platform if three conditions ("Lack of transaction costs," "Lack of volume-insensitive costs," and "Lack of constraints on pass-through") hold. See Schwartz Report, ¶ 338.

[169]   Schwartz Report, ¶ 338 ("Lack of volume-insensitive costs. Neutrality of pricing requires that there are no costs 'that a) are influenced by the platform and b) are not proportional to the number of transactions on the platform.' Such costs are not present on Steam."). See also Rochet and Tirole (2003), p. 1019.

[170]   Rochet and Tirole (2003), pp. 1019–1020 ("For example, while software developers incur some costs, such as the per-game royalties paid by game developers, that are proportional to sales, many costs are insensitive and

reached his conclusion by only looking at one side of the industry, and by failing to consider the types of costs that exist within this industry.[171]

130.   **By ignoring "volume-insensitive costs" and membership benefits, Dr. Schwartz incorrectly concludes he can model Steam's pricing as one-sided.** Steam not only decreases these "volume-insensitive costs" but also invests heavily to provide additional and free benefits to consumers and publishers. For example, on the consumer side, Steam stores users' game libraries indefinitely and allows users to easily access any game they purchased on any of their computers.[172] Steam does not charge consumers for offering this feature.[173] Steam offers various other features with similar benefits to users that are not dependent upon the number of games purchased.[174] On the developer/publisher side, for example, Steam provides a feature (Remote Play) that allows consumers far from each other to play together even when an online multiplayer feature is not explicitly

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affected by the platform: The fixed development cost is influenced by platform through software design, and so is the fixed charge for the development kit. On the user side, getting familiar with the platform's user interface may also involve some fixed costs.").

[171]   Users might also face additional "volume insensitive costs" such as those associated with setting up a friends list or their initial library of games. See, e.g., Ben Kuchera, "Valve Launches Steam Community, Perhaps a Bit Soon," *Ars Technica*, August 7, 2007, available at https://arstechnica.com/gaming/2007/08/valve-launches-steam-community-perhaps-a-bit-soon/, accessed on May 10, 2024 ("The Steam Community is an ambitious new set of features added to the Steam client, things like a global friends list, voice chat, chat rooms, game lobbies, and some pseudo-social networking features like rudimentary profiles and user groups. As a plus, several of the features like messaging, your friend list, and voice chat are all slated to be available in and out of game."); Gavin Phillips, "The Best Way to Organize Your Massive Steam Library," *Make Use Of*, July 4, 2017, available at https://www.makeuseof.com/tag/organize-steam-library/, accessed on May 10, 2024 ("How many games are in your Steam library? 10? 100? Maybe even 1,000? Once you've splurged on a few legendary Steam sales, been charitable with Humble Bundle, and backed a few Kickstarter projects, your library can become a scary and overwhelming place.").

[172]Steam Support, "Steam Account Use," available at https://help.steampowered.com/en/faqs/view/71EA-CDCE-FB5C-82B3, accessed on May 7, 2024 ("Can I use my Steam account on other computers? You may use your Steam account on any machine which can connect to the Steam network – Steam allows you to download and install any games registered to your account as soon as you log in.").

[173]   Taylor Lyles, "How to Download Steam on Your PC or Mac, and Gain Access to the Internet's Largest Collection of Games," *Business Insider*, November 13, 2019, available at https://www.businessinsider.com/guides/tech/how-to-download-steam, accessed on May 6, 2024 ("Steam itself is free to use, and free to download.").

[174]   For example, Steam offers Steam Family Sharing, which allows up to five Steam accounts to play each other's games while saving their individual progress and earning individual achievements; Wishlist, which notifies users when games they are interested in are available to purchase; and Dynamic Collections, which allow users to create customizable filters to organize their game libraries. See Steam, "Steam Family Sharing," available at https://store.steampowered.com/promotion/familysharing, accessed on May 7, 2024; Corbin Davenport, "10 Steam Features You Should Be Using," *How-To Geek*, March 20, 2023, available at https://www.howtogeek.com/828586/10-steam-features-you-should-be-using/, accessed on May 6, 2024; Jacob Roach, "I Use Steam Every Day, and I Couldn't Live Without These 6 Hidden Features," *Digital Trends*, August 1, 2023, available at https://www.digitaltrends.com/computing/6-hidden-steam-features-i-couldnt-live-without/, accessed on May 10, 2024.

available in the game.[175] Beyond benefiting consumers, the availability of this feature also decreases developer/publisher costs—developers do not need to invest resources to develop a similar multiplayer feature. Steam offers various other features with similar benefits to publishers or developers.[176]

131.   The academic literature often uses the term "membership charges" to refer to charges by the platform that do not depend on the number of sales.[177] I use the term "membership benefits" to refer to negative membership charges.[178] That is, instead of charging members, the platform provides benefits free of charge. The benefits I describe in the previous paragraph are "membership benefits." Steam is not the only platform that provides membership benefits—the academic literature acknowledges the existence of membership benefits in various two-sided industries including credit cards (e.g., travel insurance), newspapers, and video games.[179] In fact, providing membership benefits is an

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[175]   Deposition of ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮, pp. 246:15–248:1 ("Q. Okay. So in the retail release on October 16, 2017, and later, ▮▮▮▮▮▮▮ was designed to be played in multiplayer mode using -- provided you were using a single computer locally? A. Yes. ... Q. Okay. And the remote play together feature, which is at the bottom of the list [containing Steam features supported by ▮▮▮▮▮▮ enables people who are remote from each other over the Internet to play together and essentially expand the capability from just being a local computer   game?   A.   Yes.");   Steamworks,   "Steam   Remote   Play,"   available   at https://partner.steamgames.com/doc/features/remoteplay, accessed on May 6, 2024 ("Checking this feature allows users to invite their Steam Friends to join the game as though they were sitting at the same computer playing together. Only the host needs to own and install the game, while additional players connect through Steam Remote Play streaming technology.").

[176]   For example, Steam offers Valve Anti-Cheat, an automated system to detect cheats reported by game developers; Steam Workshop, a community sharing platform where developers can allow users to participate in content creation; and Steam Game Notifications, which allows developers to build game notifications for games that have   asynchronous   multiplayer   elements.   See   Steamworks,   "Features,"   available   at https://partner.steamgames.com/doc/features, accessed on May 6, 2024.

[177]   Rochet and Tirole (2006), p. 647 ("We distinguish between membership charges and usage charges, and between membership externalities and usage externalities ... Ex ante, the platform may charge interaction-independent fixed fees ... In the case of videogames, platforms may charge fees to game developers for development kits").

[178]   The academic literature uses the term similarly, for example, in the credit card context, see Özlem Bedre-Defolie and Emilio Calvano, "Pricing Payment Cards," American Economic Journal: Microeconomics, 5(3), 2013, pp. 206–231 at p. 211 ("In what follows, we assume that consumers and merchants are heterogeneous both in their usage and membership benefits from card payments.").

[179]   For credit cards, see Özlem Bedre-Defolie and Emilio Calvano, "Pricing Payment Cards," American Economic Journal: Microeconomics, 5(3), 2013, pp. 206–231 at p. 211 ("For instance, cardholders enjoy the security of not carrying large amounts of cash, membership privileges (such as access to VIP), travel insurance, ATM services (such as account balance sheets, money transfers, etc.), social prestige (club effects)."). For newspapers, see E. Glen Weyl, "A Price Theory of Multi-Sided Platforms," American Economic Review, 100(4), 2010, pp. 1642–1672 at p. 1663 ("Newspaper readers and software producers, to name a few, clearly differ substantially in their membership benefits and costs, respectively, of participating in a platform.").

important two-sided dimension of video game platform competition, a dimension that Dr. Schwartz dismisses.[180]

132.   The omission of membership benefits from Dr. Schwartz's analysis is particularly striking given that the academic literature cited by Dr. Schwartz acknowledges that modeling the total price structure including membership benefits (and not only transaction fees or the revenue share) is important.[181] Further, the literature also acknowledges that modeling transaction fees (i.e., the revenue share) is not a substitute for modeling membership benefits,[182] and that the structure of volume-insensitive charges (i.e., membership benefits) is not price neutral.[183] Dr. Schwartz does not model platforms' decisions to offer membership benefits. By ignoring membership benefits, Dr. Schwartz models competition as one-sided despite the existence of two-sided pricing incentives.

133.   By failing to consider the membership benefits Steam provides to users and publishers, and by modeling Steam as a one-sided platform, Dr. Schwartz has fundamentally mis-specified his damages model. As a result, his one-sided damages model is fundamentally flawed and is not able to accurately depict the important two-sided nature of the video game industry. In the but-for world where, according to Dr. Schwartz, Steam's market

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[180]   Robin Valentine, "PC Gaming's Many Launchers, Reviewed for 2024: Steam Still Puts the Rest to Shame," *PC Gamer*, January 30, 2024, available at https://www.pcgamer.com/pc-gamings-many-launchers-reviewed-for-2024-steam-still-puts-the-rest-to-shame, accessed on May 6, 2024 ("The biggest and still the best, Steam offers both the widest range of games and the best suite of features of any of the available launchers. Customisable tags and folders let you keep your collection organised and easily browsable; your wishlist is easily managed and automatically lets you know about the best discounts; and full social hubs for every game let players share opinions, guides, screenshots, and more … seeing how much others struggle to match Steam's functionality and breadth of choice certainly brings home what a remarkable thing Valve has achieved. Steam is easily the most beloved launcher in the business, and that devotion is well-earned."); Schwartz Report, ¶ 338.

[181]   For example, Rochet and Tirole (2006), p. 645, "obtain new results on the mix of membership and usage charges when price setting or bargaining determine payments between end-users." This suggests modeling both charges can be important in many settings.

[182]   Since these "fixed costs are sunk," they cannot influence transaction fees; hence, modeling transaction fees cannot substitute for modeling membership benefits. See Rochet and Tirole (2006), p. 651 ("When the two sides transact *ex post*, fixed costs are sunk and therefore irrelevant."). Further, the main point as highlighted in the abstract of the Rochet and Tirole (2006) article is to jointly model usage and membership charges. See Rochet and Tirole (2006), p. 645 ("We build a model integrating usage and membership externalities that unifies two hitherto disparate strands of the literature emphasizing either form of externality, and obtain new results on the mix of membership and usage charges when price setting or bargaining determine payments between end-users.").

[183]   Rochet and Tirole (2006), p. 651 ("This implies that the structure of fixed fees matters."). As Rochet and Tirole show, the structure of transaction fees can be neutral even when membership fees make the price structure non-neutral. See Rochet and Tirole (2006), p. 651 ("The nonneutrality of fixed fees is most dramatically illustrated by the following extreme but telling example, due to Wright (2003) … By contrast, the allocation of the variable fees a^B and a^S keeping the total variable fee $a = a^B + a^S$ constant is still neutral, provided that there are no transaction costs that install grains of sand in the passthrough mechanism. First, the volume of *ex post* transactions is insensitive to the variable fees allocation for given membership levels. Second, the split of total end-user surplus between the two sides can be shown to be unaffected by the allocation of the total variable fee; membership on either side is therefore unchanged.").

share would fall by approximately ▮percentage points, Steam would likely not be able to offer the same set of features to users and publishers of the platform. Dr. Schwartz's model does not account for these changes in membership benefits to users and publishers in the but-for world. Because of the existence of network effects, users would find the platform less desirable, and developers would find publishing on the platform less desirable. Dr. Schwartz's model has no mechanism to consider these types of consequences.

134.   As a result, modeling membership benefits could fundamentally change Dr. Schwartz's damages estimates in a way that is not common across proposed class members.[184] In a but-for world, Valve might change its provision of membership benefits to publishers and consumers on Steam. Any change to membership benefits between the as-is and but-for worlds would affect damages (if any) that proposed class members incur. For example, if Steam were to reduce membership benefits to publishers in the but-for world, this would decrease damages (if any) that publishers would incur. However, these membership benefits are not always monetary, and publishers value these membership benefits differently. For example, some publishers value the Remote Play feature I discussed earlier, while for others that already offer an online multiplayer functionality, this feature may not be useful. Similarly, for some developers who use Steam Direct to distribute their games, the Steam Direct submission fee is recoupable, while for others it is not.[185] Further, any changes to Steam's consumer-side membership benefits might also influence damages (if any) differently to each publisher in the proposed class.[186] For all

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[184]   Dr. Schwartz does not specify how (if at all) Steam's alleged PMFN would affect these "volume insensitive costs" in the but-for world. I do not claim affirmatively that any of the hypotheticals I discuss are more likely to accurately describe the but-for world than others.

[185]   See Steamworks, "Steam Direct Fee," available at https://partner.steamgames.com/doc/gettingstarted/appfee, accessed on May 10, 2024 ("Whether you are completing the Steam Direct signup process or are already an established Steamworks developer, you can now simply pay a $100 USD (or equivalent) fee for each new app you wish to distribute on Steam... The Steam Direct Fee is not refundable, but will be recoupable in the payment made after your product has at least $1,000.00 Adjusted Gross Revenue for Steam Store or in-app purchases.").

[186]   For example, some publishers face new consumers with high "volume-insensitive costs" on Steam. These publishers might decrease game prices to support these consumers in case Steam makes it more difficult for consumers to use Steam. A real-world example of such costs imposed by platforms is EGS charging additional payment processing fees for some (but not all) payment methods used by consumers; these additional fees may differentially affect publishers' consumer bases, and publishers may not all respond in the same way to these costs. See Epic Games, "Frequently Asked Questions," available at https://www.epicgames.com/site/en-US/epic-games-store-faq, accessed on May 10, 2024 ("The Epic Games Store supports credit cards, PayPal, and a variety of alternative payment methods ... Methods carrying additional payment processing fees are marked with an *asterisk.").

these reasons, any changes to Steam's policies influence membership benefits in a way that is not common across proposed class members.

135. **In sum, to accurately estimate damages for proposed class members, Dr. Schwartz would need to conduct individualized inquiry to understand, at the very least:** (i) how important publisher-side membership benefits are to each publisher; (ii) how changes to Steam's policies would affect each publisher; and (iii) how each publisher would react to any changes in Steam's policies affecting consumer-side membership benefits. Dr. Schwartz has neither conducted nor proposed such analyses. These are empirical questions—how sensitive publishers are to changes in revenue share rates of platforms, to what degree do publishers prefer Steam for non-price reasons such as its quality, how would network effects impact the choices and equilibria in this industry, among other questions—that Dr. Schwartz ignores. Instead, Dr. Schwartz assumes a but-for market share (which determines the but-for effective revenue share in his model), which drives all of the damages he estimates in his model.[187] By failing to account for network effects (and failing to introduce publisher choice in his model), Dr. Schwartz ignores the two-sided nature of the industry and mischaracterizes the but-for world and the optimizing choices that platforms and publishers would make.[188]

4.3. Empirical analyses demonstrate that Dr. Schwartz's damages estimates are sensitive to alternative assumptions; individualized inquiry is necessary to establish economic harm to each proposed class member

136. As explained in Section 4.2, Dr. Schwartz has not provided a suitable model of either the challenged conduct or the industry. Instead, he uses an unsuitable model of the industry together with unsubstantiated assumptions about the impact of a PMFN to calculate damages. His damages estimates rely on assumptions that are not supported by the facts of the industry or any economic modeling framework. Further, none of his proposed "class-wide damages" disentangle the contracts and relationships between individual

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[187]   Dr. Schwartz's damages estimates are also sensitive to these aggregate inputs (Steam's as-is market share, but-for market share, and but-for revenue share rate). For example, if Steam's as-is market share were estimated as ▮ percent rather than ▮ percent, estimated damages in Dr. Schwartz's model would be ▮ rather than ▮ See Workpaper 2.

[188]   The academic literature often defines two-sided industries by the existence of indirect network effects. See Marc Rysman, "The Economics of Two-Sided Markets," *Journal of Economic Perspectives*, 23(3), 2009, pp. 125–143 at p. 126 ("Generally speaking, research in two-sided markets explores choices by market intermediaries, particularly pricing, when there is some kind of interdependence or externality between groups of agents that the intermediary serves."). Dr. Schwartz not only ignores network effects generally, but he also ignores a defining characteristic of two-sided industries.

developers and publishers.[189] In this section, I perform three sets of sensitivity analyses that highlight the importance of these flaws in his model. I demonstrate that accounting for different assumptions about publishers' choices of platform (Section 4.3.1), revenue share rates for their games (Section 4.3.2), and pass-through rates (Section 4.3.3) yields economically meaningful changes in estimated damages—including changes in whether individual proposed class members are (allegedly) harmed at all.

137.   This set of exercises establishes the need for individualized inquiry in this matter by demonstrating that Dr. Schwartz's assumptions of commonality are flawed, and that adjusting those assumptions changes his results substantially. I emphasize that the adjustments I make to Dr. Schwartz's model in this section do not correct its fundamental flaws, nor do I put forth these sensitivities as valid, reliable models for the estimation of harm or damages in this case. Rather, I use these empirical exercises to demonstrate that the critiques I make in Section 4.2 matter economically for Dr. Schwartz's results.

4.3.1.   Alternative assumptions regarding where publishers would sell their games in the but-for world impact Dr. Schwartz's damages estimate, underscoring the need for individualized inquiry

138.   Dr. Schwartz's damages model fails to capture publisher choices that are critical for understanding the impact of a PMFN. Because he has not modeled publisher decision-making, Dr. Schwartz cannot predict how publishers set game prices on any distribution platform, much less across platforms.[190] As I explained in Section 4.2.1, platform differentiation would lead publishers to make alternative platform choices in Dr. Schwartz's but-for world. Further, as explained in Section 4.2.4, by ignoring network effects, Dr. Schwartz mischaracterizes the but-for world and the optimizing choices that platforms and publishers would make. In this section, I explain how platforms' choices in the but-for world—including revenue share and platform quality—and publishers' choices in the but-for world—including whether and to what degree to sell games on different platforms—matter for the determination of damages.

139.   **Dr. Schwartz's "overcharge" depends on a publisher's but-for revenue share, which would likely vary with platform choice.** Dr. Schwartz's overcharges and damages

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[189]   Schwartz Report, ¶¶ 398–400.

[190]   Further, predicting how publishers set game prices would necessitate modeling consumer behavior, which is not captured in Dr. Schwartz's model. To reliably predict publisher pricing, Dr. Schwartz would need to model how consumers would respond to any changes in prices.

estimates are based on the difference in revenue share a publisher would pay on its games between the as-is world and the but-for world[191]—and in the but-for world, some publishers will sell their games on other platforms besides Steam. This means that when calculating damages, it is important to account not only for Valve's alleged but-for revenue share, but also the revenue shares of Steam's competitors in the but-for world. Dr. Schwartz acknowledges that distribution platforms have different headline revenue shares;[192] furthermore, in his PCM, he claims that some platforms would have higher revenue shares in the but-for world.[193] Yet Dr. Schwartz ignores these facts in his damages model.

140.   Dr. Schwartz has not put forth a common methodology to calculate either but-for revenue shares on other platforms or what fraction of a publisher's sales would occur on other platforms in the but-for world. In some instances, Steam's competitors may have lower but-for revenue shares; they may be low-quality, low-price rivals with few features. On the other hand, Steam's competitors may have higher but-for revenue shares; they may compete more strongly on features to attract consumers, developers, and publishers while retaining high revenue shares.[194] As a result, the revenue that publishers will pay to distribution platforms in the but-for world in Dr. Schwartz's model may be less than, equal to, or greater than what Dr. Schwartz predicts.

141.   As an example, consider two hypothetical publishers, each with one game that they publish on Steam in the as-is world. Dr. Schwartz would assume either: (i) that both of these publishers continue to sell their games on Steam in the but-for world; or (ii) that if they move to another platform, they pay the same (Steam's) but-for revenue share. However, suppose one publisher's game has highly price-sensitive consumers. In the but-for world, that publisher may find it optimal to sell more of its games on a low-quality, low-revenue-share platform and to sell its games at a lower price (allegedly impossible in the as-is world due to the alleged PMFN).[195] Then its relevant but-for revenue share in Dr.

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[191]   Schwartz Report, Section 8.5.

[192]   See, e.g., Schwartz Report, ¶ 149.

[193]   See, e.g., Schwartz Report, Table 3.

[194]   In Dr. Schwartz's but-for world where Steam has a much lower market share, it may be that Steam's competitors would have higher revenue shares than Steam. This is true regardless of whether Steam has the highest revenue shares in the as-is world.

[195]   Alternatively, this publisher could sell their game on many platforms, but *consumers* choose to purchase it on this low-quality, low-revenue-share platform. Since the relevant question here is where a publisher makes their sales and what revenue shares they pay to the platform, it ultimately depends on where consumers choose to make purchases.

Schwartz's model would not only be Valve's, but that of the low-revenue-share competitor platform. The other publisher may find it optimal in the but-for world to make its sales on a high-quality, high-revenue-share platform with better search quality, user reviews, or other platform features that attract consumers. Again, the relevant but-for revenue share would not be Valve's, but its competitor's. For both of these publishers, harm in Dr. Schwartz's model would be the extent to which they paid higher revenue shares in the as-is world relative to whatever revenue shares they paid in the but-for world for those sales. Without considering other platform's but-for revenue shares and the extent to which publishers' sales would move to these other platforms, Dr. Schwartz cannot reliably estimate damages for these publishers.

142.   To understand how this analysis works, consider the publisher Ubisoft that publishes several games, including *Assassin's Creed* and *Brawlhalla*. In the as-is world, *Assassin's Creed* has an average revenue share of ▮ percent, and *Brawlhalla* has an average revenue share of ▮ percent.[196] Aggregating across games to the publisher level, Ubisoft pays approximately ▮ percent of its game revenues to Valve.[197] In the but-for world, Dr. Schwartz assumes that all of Ubisoft's games either continue to make the same sales on Steam but at lower revenue shares (each declining by about ▮▮▮▮) or move to another platform and pay the same, lower revenue share, yielding an average revenue share of about ▮ percent for Ubisoft, implying harm. However, in the but-for world, Ubisoft may have sold these games elsewhere and paid a different revenue share. For example, *Brawlhalla* may have been sold predominantly on a Steam competitor with a ▮ percent revenue share in the but-for world, meaning Ubisoft would pay a higher revenue share and be *worse off* for sales of this game in the but-for world. Alternatively, Ubisoft may have sold *Assassin's Creed* on a Steam competitor that takes a ▮ percent revenue share, meaning Ubisoft could be even better off in the but-for world. Further still, publisher Ubisoft may have sold different amounts of each game on different platforms in the but-for world. In that case, Ubisoft may be harmed on some game sales and not on others (and to the extent that there are different developers, some developers could be harmed while others not at all). This uncertainty is unresolvable without individualized

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[196]   Workpaper 3. Throughout this paragraph, *Assassin's Creed* refers to the original game in the series with this title, rather than the entire *Assassin's Creed* franchise. Further, the reported revenue shares do not account for Steam keys, which I discuss in Section 4.3.2.

[197]   Schwartz Report, ¶ 401 ("Next, I multiply commissions paid to Valve by ▮▮% to arrive at a but-for commission for a given commission rate.").

inquiry and a reliable model of where publishers would sell their games in the but-for world.

143.   Exhibit 3 depicts the approximate uncertainty in damages due to Dr. Schwartz's failure to consider platform switching in the but-for world. In the solid blue line, I provide Dr. Schwartz's estimate of damages for the top 100 publishers in terms of his damages measure.[198] In grey, I also provide the estimate of damages according to Dr. Schwartz's model if publishers were to divert their sales to rival platforms with revenue shares between 10 and 30 percent in the but-for world.[199] That is, the grey area represents the range of possible damages outcomes according to Dr. Schwartz's model depending on the degree to which publishers were to sell their games on rival platforms with different revenue shares in the but-for world. In particular, each publisher's estimated damages could lie *anywhere* in the depicted range—some publishers could have greater harm than Dr. Schwartz predicts, some could have less, and many go from harmed to unharmed depending on the assumption being made. Moreover, the analysis in Exhibit 3 excludes the consideration of Steam keys, which may reduce a game's as-is *effective* revenue share below 10 percent and could further widen a game's range of possible damages.[200]

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[198]   The results for the remaining publishers are substantively similar. Due to the large number of publishers, for ease of interpretation I provide only the 100 largest publishers in terms of Dr. Schwartz's estimated damages.

[199]   I choose 30 percent as the upper bound because it is Valve's highest headline rate and common in the industry. See Tom Marks, "Report: Steam's 30% Cut is Actually the Industry Standard," *IGN*, January 14, 2020, available at https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard, accessed on May 6, 2024. I choose 10 percent as the lower bound based on Dr. Schwartz's reference to ███████████. See Schwartz Report, ¶ 149.

[200]   I explore the consideration of Steam keys in Section 4.3.2.

Exhibit 3
Publishers' substitution to other platforms affects publisher-level harm in Dr. Schwartz's model

Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Model Inputs, Schwartz Passthrough, Schwartz Valve Market Share on Steam)
Note:
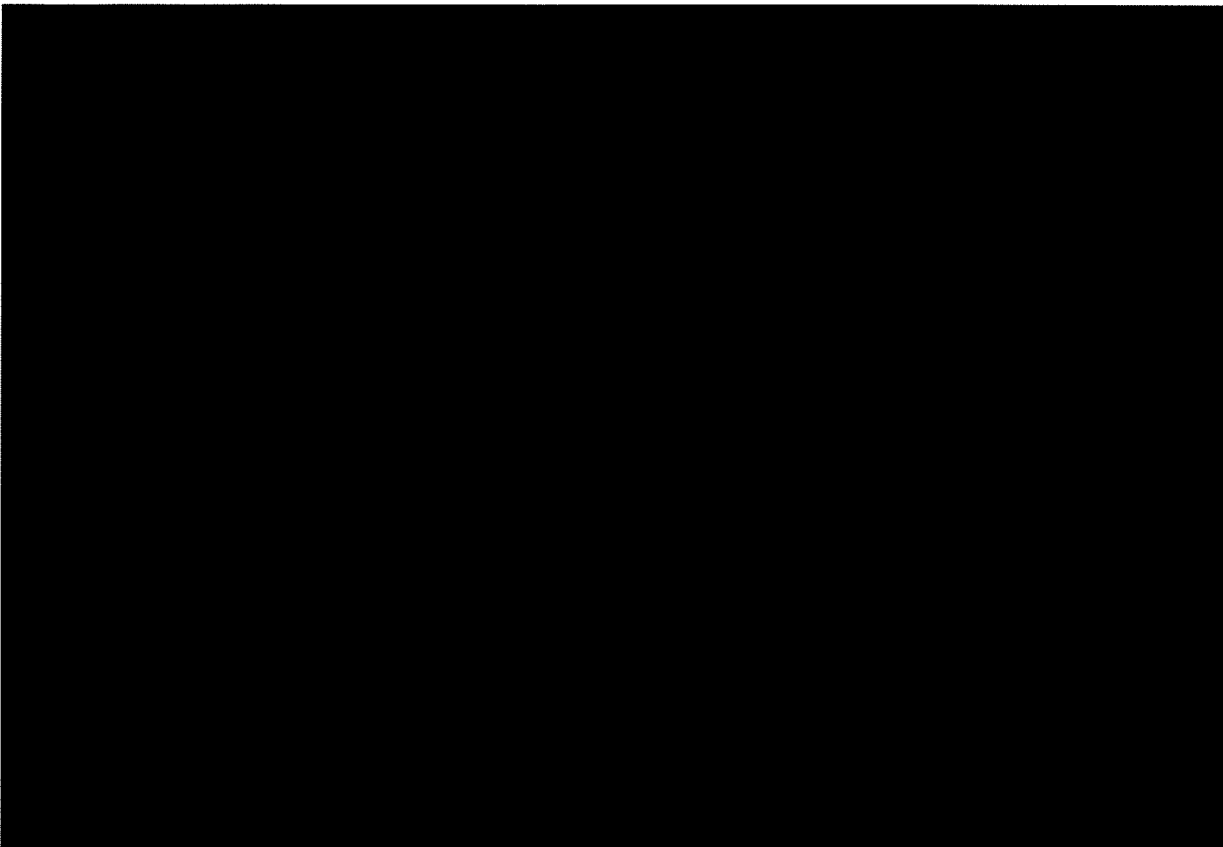Damages are calculated using the same methodology and code that Dr. Schwartz uses, and all inputs, with the exception of the but-for revenue share, are identical. I choose 30 percent as the upper bound because it is Valve's highest headline rate and common in the industry. See Tom Marks, "Report: Steam's 30% Cut is Actually the Industry Standard," *IGN*, January 14, 2020, available at https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard, accessed on May 6, 2024. I choose 10 percent as the lower bound based on Dr. Schwartz's reference to ███████████████. See Schwartz Report, ¶ 149. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Dr. Schwartz's 20 percent pass-through rate is used for this analysis. Following Dr. Schwartz's methodology, data records are limited to transactions that took place between January 28, 2017 and December 31, 2022 and are recorded in USD.

144.   Dr. Schwartz has not provided any information on how to determine where within the range each publisher would fall. At minimum, he would need to know: (i) how platforms would compete for both consumers and publishers in the but-for world (including through setting revenue shares and offering different features in an industry with network effects); (ii) where publishers would choose to sell their games (responding to platforms' offers of features and revenue shares); and (iii) where users would choose to buy their

games in the but-for world (based on platform features, publisher presence, and prices). And because these choices would likely differ for each game and each publisher, whether individual proposed class members are (allegedly) harmed at all depends on the individual circumstances of each publisher. Dr. Schwartz's model does not and cannot make these predictions using common evidence; individualized inquiry would be necessary to make predictions about each proposed class member.

145.   **In sum, Dr. Schwartz's failure to model where publishers would sell their games in his but-for world assumes rather than demonstrates harm.** Without understanding where publishers will sell their games (and under what revenue share), Dr. Schwartz cannot reliably estimate harm using his proposed methodology.

4.3.2.   Alternative assumptions regarding Steam key use impact Dr. Schwartz's damages estimate, underscoring the need for individualized inquiry

146.   As explained in Section 4.2.2, Dr. Schwartz assumes a common decline in the effective revenue share that Valve would charge on each game in his but-for world. He ignores the impact of substantial variation in Steam key usage on the effective revenue share publishers pay to Steam in both the as-is world and in his but-for world.

147.   In this section, I demonstrate that making different assumptions about individualized effective revenue share rates yields substantial changes in proposed damages. Dr. Schwartz has not put forth a reliable, common methodology using common evidence to estimate accurate effective revenue share rates for all games and all publishers. Doing so is not possible with the current data in the record; individualized inquiry is required to obtain necessary information on Steam key sales in the as-is world. Further, Dr. Schwartz has not proposed a methodology to determine Steam key use or whether a game would qualify for a reduced revenue share in the but-for world.[201]

148.   **Steam keys impact effective revenue shares and estimated damages in Dr. Schwartz's model.** Dr. Schwartz ignores the impact of Steam keys on publishers' effective revenue share in his model in both the as-is and but-for worlds. To alter his assumption that individualized revenue shares decline by a common ratio in the but-for world, I use

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[201]   While I focus on the impact of effective revenue shares on Dr. Schwartz's estimated damages in this section through an analysis of Steam keys, the same ideas apply to the reductions in revenue shares due to Valve's tiered revenue shares. As explained in Section 4.2.2, Dr. Schwartz has not proposed a reliable methodology to account for Valve's tiered revenue shares in his damages model.

alternative as-is effective revenue shares based on publishers' redemptions of Steam keys for their games. That is, the only thing that I change in Dr. Schwartz's model is the publisher-specific and game-specific effective revenue share rates in his calculation of overcharges and damages.

149.   As a preliminary matter, I reiterate that Valve does not possess data on publishers' Steam key sales, and those data are not in the record—nor could they be without individualized investigations and proof. In the following sensitivity, I use several approximations of the effective revenue share rates based on Steam key *redemptions*, Steam key *issuances*, and Steam game prices.[202] Neither Dr. Schwartz nor I can determine how close these approximations may be to what publishers actually did in the as-is world, but I use these approximations because they demonstrate that a proper analysis would require individualized inquiry into data not produced in this matter.

150.   To understand how the approximations work, consider named Plaintiff Wolfire Games. According to the data produced by Valve, Wolfire Games paid Steam a 30 percent revenue share on all of its ███████ units sold on Steam, Wolfire Games was issued ████████ Steam keys for which Wolfire Games paid Valve zero dollars, and consumers redeemed ██████ Steam keys for which Wolfire Games paid Valve zero dollars.[203] Intuitively, Wolfire Games' effective revenue share should be somewhere between the 30 percent it paid to Valve for its Steam sales and the 0 percent it paid to Valve for its Steam key sales. Thus, the level of its effective revenue share is an empirical question: what fraction of its revenues for Steam-enabled games were subject to Valve's revenue shares, and what fraction of revenues for Steam-enabled games were not?

151.   Because I do not have data on Steam key sales, I can only *assume* possible Steam key revenues using proxies. In the analyses below, I use data on Steam key redemptions and Steam key issuances (which provide different assumptions of quantities) and daily data

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[202]   The approximations I estimate here are just a few examples to highlight how much the results change based on different assumptions. For example, the true level of Steam key sales might be anywhere between issuances and redemptions (and differ for each publisher and each game), and the true prices might not be well represented by the daily Steam prices I use (and differ for each publisher and each game). As I explain in this section, not only do these different approximations yield different results, but true Steam key sales revenues might differ vastly for each publisher.

[203]   The date range between January 28, 2017 and December 31, 2022 is used to match Dr. Schwartz's methodology for calculating damages. See Workpaper 4.

on Steam product prices (which provide an assumption of prices).[204] Using different assumptions, I then estimate alternative effective revenue shares for Wolfire Games to be between 8 percent and 11 percent in the as-is world.[205] By contrast, Dr. Schwartz assumes Wolfire Games' effective revenue share of 30 percent is unaffected by Steam key use. I calculate similar approximations for all games and all publishers.

152.   Dr. Schwartz assumes Steam keys have no impact in his model and that Steam key usage is identical in his but-for world.[206] By contrast, I assume Steam key usage impacts the game-level effective revenue share each publisher pays to Steam in the manner described above, and I estimate two possible but-for world outcomes that make different assumptions about Steam keys: (i) Steam key sales are identical in the but-for world; (ii) there are no Steam key sales in the but-for world.[207]

153.   The incorporation of Steam keys into publishers' effective revenue shares has a large impact on Dr. Schwartz's estimate of their damages. Exhibit 4 depicts, for the top 100

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[204]   In this matter, Valve produced data on the number of Steam keys redeemed and the number of Steam keys requested, including which requests were approved and therefore issued. To approximate revenues from Steam key sales using Steam key redemptions, I assume that the number of Steam keys sold is equal to the number of Steam keys redeemed and that the prices at which they were sold are equal to the prices of the associated packages on Steam. I use Steam transaction data to assign a price to each redemption. When Steam transactions for the associated package are observed on the same day and in the same country as the Steam key redemption, I assume that the Steam key was sold at the average price in that country on that day. If there are no same-day and same-country transactions observed for that package, I use a continuously broader time interval (i.e., week, month, three months, six months, year, year prior to the year of redemption, and year following the redemption year) for the average price in the country of redemption. If there are no transactions for that package in the country of redemption, I assume that the Steam key was sold at the average price across all other countries during the year of redemption. Finally, if there are no transaction data available for the associated package, I assume that the Steam key was sold at a price of zero dollars. To approximate revenues from Steam key sales using Steam key issuances, I assume that the number of Steam keys sold is equal to the number of Steam keys issued and that the prices at which they were sold are equal to the prices of the associated packages on Steam. To approximate when and where these Steam keys were distributed, I use the average price across all days and countries of redemption from the redemption price approximation described above. When no assumed redemption price is available for a Steam key issuance, I assume that the Steam key was sold at the average price of the associated package in the Steam key transaction data. When no price is available, I assume that the Steam key was sold at a price of zero dollars. These prices are assumptions because I am not aware of any data on Steam key sale prices. Such data would require individualized inquiry.

[205]   Workpaper 4.

[206]   Schwartz Report, footnote 827. Specifically, Dr. Schwartz assumes that "Steam Keys would have been provided and used in the same manner as in the real world." However, in a but-for world where Valve charges a lower headline revenue share to a publisher, that publisher may respond by using Steam keys equally (e.g., because enough of its audience remains on Steam); less (e.g., because it switches its efforts to selling on Steam from other stores where it now sells Steam keys, or because Steam becomes less generous in granting keys); or more (e.g., because rival stores lower their revenue shares even further and become more appealing for selling Steam keys).

[207]   Publishers' revenues from Steam key sales might also lie somewhere in between these two extremes. In my presentation of this analysis, I indicate this range of possible outcomes. While intuitively unlikely for a but-for Steam with lower revenue shares and lower proposed market share, it is also possible that revenues from Steam keys would increase in the but-for world.

publishers ranked by damages in Dr. Schwartz's model: (i) Dr. Schwartz's unadjusted estimate of damages; (ii) Dr. Schwartz's estimated damages using an approximation of Steam keys based on Steam key *redemptions* and assuming Steam key sales are identical in the but-for world; (iii) Dr. Schwartz's estimated damages using an approximation of Steam keys based on Steam key *issuances* and assuming Steam key sales are identical in the but-for world; (iv) Dr. Schwartz's estimated damages using an approximation of Steam keys based on Steam key *redemptions* and assuming that there are *no* Steam key sales in the but-for world; and (v) Dr. Schwartz's estimated damages using an approximation of Steam keys based on Steam key *issuances* and assuming that there are *no* Steam key sales in the but-for world.[208] In grey shading, I represent the uncertainty between possible assumptions (ii) through (v) above, which could be due to inaccurately capturing Steam key sales or Steam key prices and which could differ by game and by publisher. As the exhibit shows, lowering publishers' effective revenue shares through an approximation of Steam keys tends to lower damages. Further, if Steam keys were to decrease (or disappear) in the but-for world, damages would be lower still—and perhaps negative, indicating that numerous proposed class members would be unharmed by the challenged conduct. The extent to which publishers' damages would fall depends upon their game-specific use of Steam keys and to what extent their use of Steam keys would decline in Dr. Schwartz's but-for world. Dr. Schwartz has not proposed a methodology to determine where in the exhibit's grey range a particular publisher might lie, and he cannot do so with common proof. He needs individualized evidence.
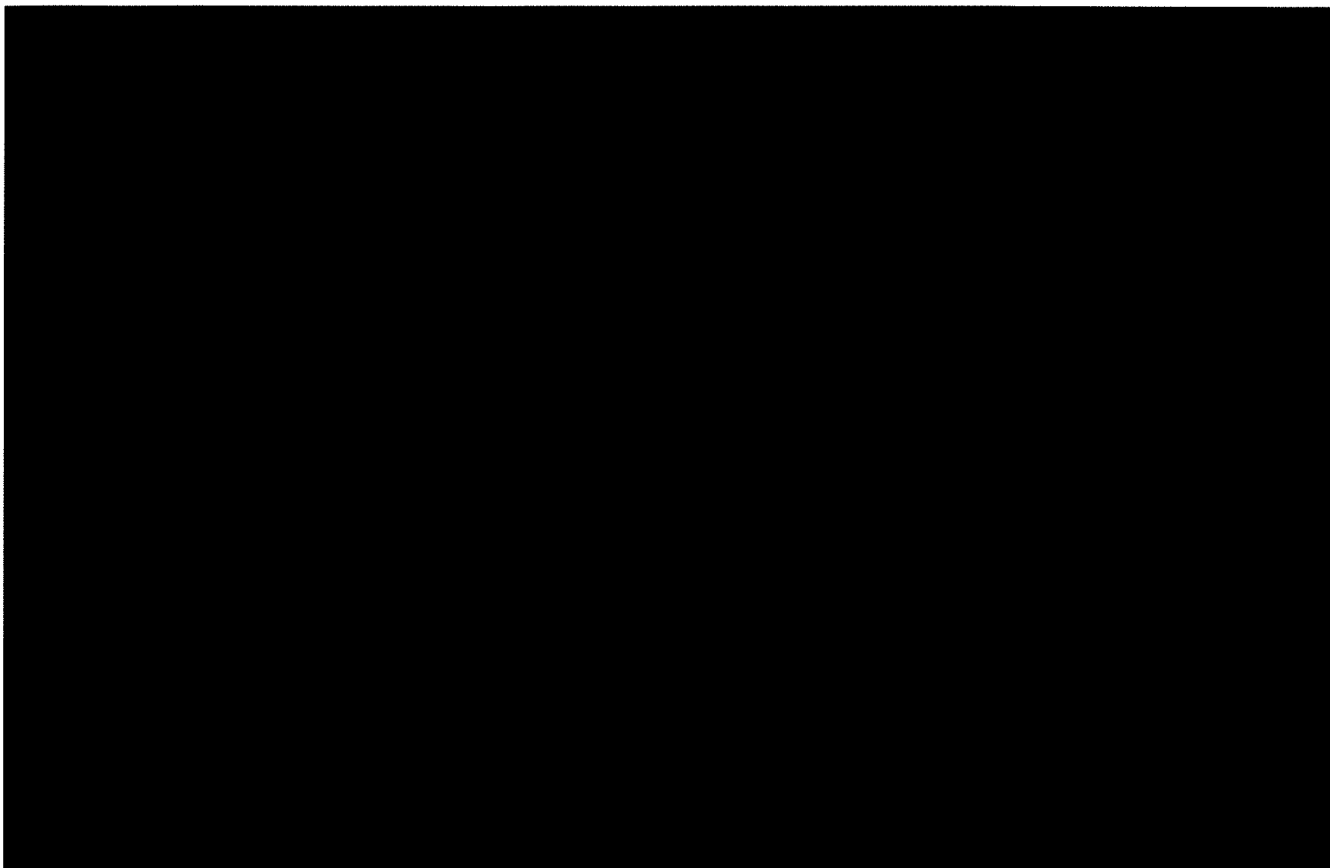
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[208]   For additional approximations for other publishers, see Appendix D.

Exhibit 4
Varying assumptions about Steam key use leads to economically important changes in publisher-level harm

Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Model Inputs, Schwartz Passthrough, Schwartz Valve Market Share on Steam); Steam Key Redemptions Data; Steam Key Requests Data
Note:
The effective revenue share rate for each publisher adopts the effective "take rate" as calculated by Dr. Schwartz, adding in the impact of Steam key redemptions or issuances and aggregating to the publisher level. These adjusted effective revenue shares are calculated using package unit sales, microtransaction sales, and package unit Steam key redemptions or issuances. See footnote 204 for more detail. To approximate the removal of Steam keys from the but-for world, I adjust each publisher's but-for world effective revenue share (which assumed the use of Steam keys) by removing the estimated revenue associated with Steam key redemptions or issuances and recalculating the effective revenue share. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Dr. Schwartz's 20 percent pass-through rate is used for this analysis. Following Dr. Schwartz's methodology, data records (including revenues, Steam key issuances, and Steam key redemptions) are limited to those that took place between January 28, 2017 and December 31, 2022 and, in the case of revenues, are recorded in USD.

154.   In a but-for world without Steam keys, up to 13,242 publishers in my approximations would actually be *worse off* in the but-for world.[209] Intuitively, this is because some publishers enjoy very low effective revenue shares through the use of Steam keys, such

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[209]   Workpaper 5.

as Wolfire Games' 8 or 11 percent, depending upon the assumptions made for Steam key sales revenue.[210] In a but-for world where Valve reduces its headline revenue share rate on Steam but does not offer Steam keys, some publishers may end up paying *more* to Valve for their Steam-enabled games in the but-for world. Furthermore, the number and set of publishers that are worse off in the but-for world changes depending on the assumptions one makes about the price and quantity of Steam keys sold.

155.   **In sum, Dr. Schwartz's assumption of a common decline in publisher-level and game-level effective revenue shares is both unfounded and quantitatively important.** Without understanding how publishers will use Steam keys in his but-for world (or determining how publishers' effective revenue shares might otherwise change, e.g., through a change in Valve's tiered revenue shares), Dr. Schwartz cannot estimate harm using his proposed methodology.

4.3.3.   *Alternative assumptions about pass-through rates impact Dr. Schwartz's damages estimate, underscoring the need for individualized inquiry*

156.   As explained in Section 4.2.3, Dr. Schwartz assumes that proposed class members would pass through any change in Valve's revenue share onto consumer prices in a common fashion in the but-for world.[211] This assumption is contrary to economic intuition and contrary to the variation in Dr. Schwartz's estimates of pass-through based on his sample of 124 games.[212]

157.   As an initial matter, both industry coverage and testimony in this case indicate that pricing video games is a complex process involving many factors.[213] Dr. Schwartz's assumption

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[210]   Workpaper 4.

[211]   Schwartz Report, ¶ 397, Figure 9.

[212]   Schwartz Report, ¶¶ 394–397.

[213]   Joseph Politano, "Video Games, Price Architecture, and the Zero Marginal Cost Revolution," *Apricitas Economics*, August 28, 2021, available at https://www.apricitas.io/p/video-games-price-architecture-and, accessed on May 3, 2024 ("Video games are on the forefront of new pricing, production, and distribution models that are shifting the way we pay for goods and services … The digital revolution has enabled many companies to completely ditch traditional models where consumers purchase games up front for a predetermined price. There is no longer a single price for most video games, but rather a complex network of prices and elaborate price architecture."); ███ ███ Deposition, p. 187:6–21 ("Q. So you said before you needed to know more than just the revenue, you needed to know how many people are playing the game. If you as a game developer are making a pricing decision, assuming all else is equal on these games, wouldn't you price the game at a lower level to get more revenue and more customers playing the game? … A. There's way too many factors that go into how revenue is generated. And there's way too many things that I care about aside from -- of course, from a strictly revenue standpoint, more revenue is better. But there's -- like what was the business model? Is it a lasting revenue stream? What does the

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that proposed class members would pass through any revenue share change onto consumer prices in a common fashion both critically oversimplifies the reality of the video game industry and is empirically inconsistent with his own analysis, as I describe below.

158.   To demonstrate the importance of pass-through rates in Dr. Schwartz's damages estimates, I alter Dr. Schwartz's damages calculation by using alternative, individualized pass-through rates rather than Dr. Schwartz's assumed common rate. I stress that Dr. Schwartz cannot perform a similar procedure for all games and publishers, as those data do not exist and would require individualized inquiry.

159.   Mathematically, pass-through rates enter his model in only one place, after he has calculated product-level overcharges.[214] Dr. Schwartz uses either 20 percent or 25 percent for each publisher.[215] This means that publisher-specific damages are either 80 percent of his estimated publisher overcharge or 75 percent of his estimated publisher overcharge. Instead, I use alternative publisher-specific pass-through rates drawn from Dr. Schwartz's sample of 124 games.

160.   According to Dr. Schwartz's analysis of his sample: (i) some publishers may reduce their consumer prices by *more* than the reduction in their revenue share rates (more than 100 percent pass-through); (ii) some publishers may reduce their prices by *a fraction* of the reduction in their revenue share rates (pass-through between 0 percent and 100 percent);

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next 18 months look like? Do -- are players happy with the way they were charged?"); ███████████████
███, p. 37:2–15 ("Q. All right. Let's talk a bit about just pricing games on Steam. Does ████████s set the prices for its games on Steam? A. Yes, it does. Q. And generally speaking, does ███████ try to price consistently across platforms? Mr. Kapoor: Objection to form. A. Generally speaking, yes. Q. (By Mr. Marks-Dias) And what are the reasons for generally trying to do that? Mr. Kapoor: Same objection. A. Consumer expectation, but also being fair to consumers."); Deposition of ████████████████████████
███████████████████████████████████, pp. 44:13–45:15 ("Q. ████████████████, when you were talking about pricing games consistently across all platforms and you said one -- one of the reasons or the main reason you do that is that's because that's what customers want; is that right? A. That's correct. Q. Are you familiar with the concept of buyer regret, where a customer buys a game in one place and they see that it was a lot cheaper somewhere else, they're upset about that? A. Absolutely, yes. Q. And is that kind of what you're driving at in terms of what customers want with games generally priced consistently across platforms? Mr. Kapoor: Objection to form; foundation. A. Yeah. We're very intentional about trying to have the right price for the product and to meet customers' expectations and ultimately then we want our pricing to be consistent and give customers choice whether they buy the game, subscribe to ████████, buy it on console, buy it on PC, buy it at our store, buy it on Steam or somewhere else. We try to give customers choice. But when they do buy a game from us, we want that price to always be consistent. Because if we don't, we'll have quite a bit of backlash. And gamers are quite vocal on social media and what have you. So, you know, it just would not be smart for us because we think about customer sentiment in our business.").

[214]   As clarified in Dr. Schwartz's code and in Attachment G-7 of his report, damages are computed as (1 − Passthrough Rate) × Publisher Overcharge.

[215]   Schwartz Report, ¶ 397, Figure 9.

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and (iii) some publishers may even *increase* their prices after the reduction in their revenue share rates (pass-through below 0 percent).[216] Using game-specific pass-through rates (but otherwise using Dr. Schwartz's methodology) can result in estimated damages that exceed overcharges, that are a fraction of overcharges, or that are *negative*.

161.   As an example, consider ██████ and ████████, that both qualified for additional revenue shares (i.e., these games paid lower revenue shares to Valve). In Dr. Schwartz's analysis of game-level pass-through, ██████ has a *negative* 36 percent pass-through rate (i.e., it is more expensive in the year following its qualification for a lower revenue share).[217] Conversely, ████████ has a 75 percent pass-through rate (i.e., it is less expensive in the year following its qualification for a lower revenue share).[218] Said differently, Dr. Schwartz estimates that ████████ would tend to pass most of its savings in revenue share onto consumer prices, whereas ██████ would actually become more expensive.[219] However, in his damages estimation, Dr. Schwartz assumes that both ████████████ would pass through 20 percent (or 25 percent) of the change in revenue share to consumer prices. Dr. Schwartz's assumption is thus contradictory to his own results and to testimony that game pricing is a complex process not solely dependent upon revenue share or other costs.[220] As such, Dr. Schwartz's model does not accurately reflect the variation in prospective pass-through in the industry. To understand how important this modeling failure is to his damages

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[216]   Estimated pass-through rates exceeding 100 percent and below 0 percent demonstrate the unreliability of Dr. Schwartz's empirical strategy. From a theoretical perspective, the primary reason for these unusual pass-through rates would be imperfect competition, which Dr. Schwartz does not model. See, e.g., Jacquelyn Pless and Arthur van Benthem, "Pass-Through as a Test for Market Power: An Application to Solar Subsidies," *American Economic Journal: Applied Economics*, 11(4), 2019, pp. 367–401. Alternatively, the unreliability of Dr. Schwartz's empirical strategy leads to very imprecise estimates far from their true value. Regardless of the nature of the problem, Dr. Schwartz's assumptions and estimation are incorrect.

[217]   Workpaper 6. Specifically, ██████ average price for the year before its qualification is ████, and its average price for the year after is ████.

[218]   Workpaper 6. Specifically, ████████ average price for the year before its qualification is ████, and its average price for the year after is ████.

[219]   An additional example is ██████ Dr. Schwartz estimates a 0 percent pass-through rate for this game. See Workpaper 6. ██████ price increased at least twice since 2018 (the game has a "no sale" policy) but these price increases were outside the window Dr. Schwartz considered for this game. ██

[220]   ██████ Deposition, p. 187:6–21; ████████ Deposition, p. 37:2–15; ██████ Deposition, pp. 44:13–45:15.

estimates, I analyze the difference in estimated damages using his 20 percent pass-through rate versus his sample of individualized, game-level pass-through rates.

162.   Exhibit 5 depicts game-level damages using Dr. Schwartz's common 20 percent pass-through rate versus estimates of game-level damages using Dr. Schwartz's game-specific pass-through rates. The smooth grey line depicts Dr. Schwartz's damages estimates for the 124 games for which he calculates pass-through using his assumed 20 percent pass-through rate. The fluctuating red line depicts the same damages estimates instead using the game-level pass-through rates that Dr. Schwartz estimates. As the exhibit shows, damages vary dramatically depending on assumptions about pass-through rates. For 28 games, using Dr. Schwartz's game-specific pass-through rates would yield *negative* damages—that is, a game's publisher would be *worse off* in the but-for world. Further, this exhibit does not depict estimates of game-level damages for the 73,956 games and 31,765 publishers for which Dr. Schwartz does not and cannot estimate pass-through rates.[221]

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[221]   This count of games is limited to games considered in Dr. Schwartz's damages calculations that were published by U.S. publishers or foreign publishers with U.S. sales. Games that are not considered in Dr. Schwartz's damages calculations (e.g., games that did not have revenue on Steam between January 28, 2017 and December 31, 2022) are not included. This count of publishers is limited to U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. See Workpaper 7.

Exhibit 5
Dr. Schwartz's use of a common pass-through rate masks important variation in alleged damages
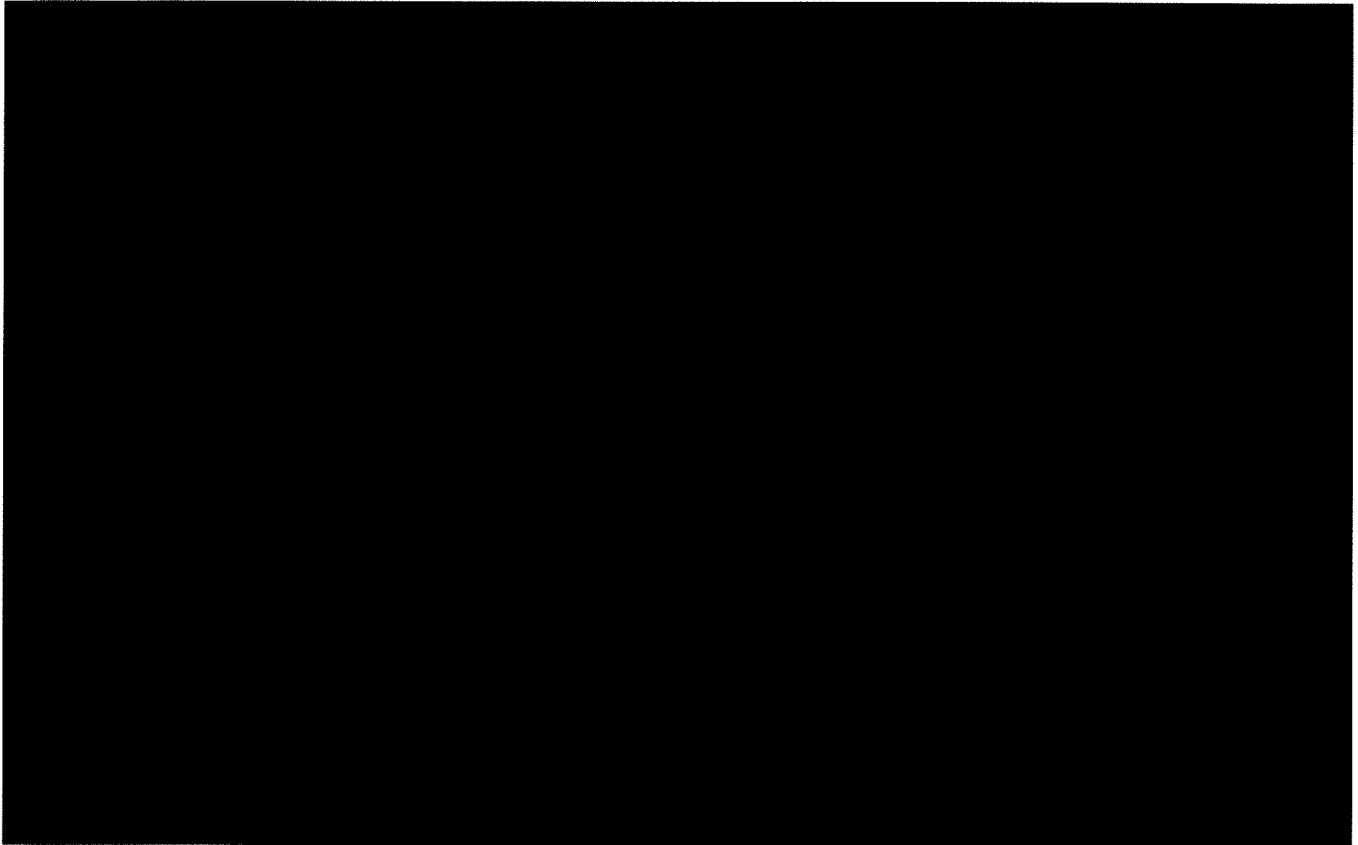
Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Model Inputs, Schwartz Passthrough, Schwartz Valve Market Share on Steam)
Note:
Dr. Schwartz estimates pass-through rates for 124 apps that qualified for a reduced revenue share of 25 percent, did not subsequently qualify for a reduced revenue share of 20 percent, had revenues from at least 360 days before to 360 days after the revenue share change, and had pricing and transaction data available for at least 50 percent of the days in that 720-day window. See Schwartz Report, ¶¶ 392–394. This analysis does not include 73,956 games included in Dr. Schwartz's damages calculations for which Dr. Schwartz does not calculate individual pass-through. Following Dr. Schwartz's methodology, data records are limited to transactions that took place between January 28, 2017 and December 31, 2022 and are recorded in USD.

163. **In sum, Dr. Schwartz's assumption of common pass-through ignores substantial variation in game-level pass-through, which has important implications for whether individual publishers are harmed in his model.** Without proposing a reliable methodology that can estimate pass-through on a game-by-game basis (and can isolate the impact of a change in revenue shares from any other influence), Dr. Schwartz cannot reliably estimate harm.

5.   Dr. Schwartz's proposed PCM is unreliable and cannot establish class-wide harm through a common methodology

164.   Dr. Schwartz's PCM makes predictions that are at odds with the real world and with basic economics. Perhaps most importantly, his estimate of the as-is world predicts negative economic profits. In the real world, most publishers are profitable, and would make different business decisions (such as exiting the market) if they indeed earned sustained negative profits.[222] Dr. Schwartz also predicts large marginal costs for publishers, which he does not attempt to justify or support with real-world evidence. Because his PCM cannot reliably predict the as-is world, it is ill-suited to predict what would happen in the but-for world (Section 5.1).

165.   Dr. Schwartz's PCM fails to make reliable predictions about the as-is world for at least two reasons. First, he bases his PCM on a model developed by Andre Boik and Kenneth C. Corts, which was not designed to be taken directly to data. In economics, some models are deliberately stylized theoretical models that are meant to illustrate a specific point in a specific context. Taking such a model out of this context and applying it to data from a specific industry will not generate reliable predictions, as is the case with Dr. Schwartz's PCM (Section 5.2). Second, his PCM fails to capture several critical components of the video game industry, which is characterized by multiple and differentiated publishers, games, consumers, and platforms. For instance, his PCM does not model network effects, it models only a single publisher with a single game, and it does not allow for platforms other than Steam and EGS. By failing to model the economic behavior of so many actors within the industry, Dr. Schwartz's PCM fails to reliably depict how publishers make decisions in either the as-is or but-for worlds (Section 5.3).

166.   I use two simple examples to demonstrate how Dr. Schwartz's model is ill-equipped to model the video game industry in either the as-is or but-for worlds. First, I consider one of the parameters Dr. Schwartz uses in his model—the "demand disadvantage." This parameter is intended to measure the extent to which consumers would prefer Steam to EGS. While Dr. Schwartz assumes that this parameter is large, fixed, and persistent, his

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[222]   I understand that Dr. Schwartz refers to digital distribution platforms (e.g., Steam, EGS) when discussing his PCM, and as such I refer to the same in my discussion of "platforms" throughout Section 5 of my report. Further, as I discussed in Section 2.2, whereas Dr. Schwartz and Boik and Corts refer to "sellers" that are charged a "commission rate" or "fees" to sell their games on a platform, I refer to these "sellers" as "publishers" and the associated "commission rate" or "fees" they are charged by platforms as a "revenue share." Additionally, my use of "publishers" in this context includes both "publishers" as defined in Section 3 and "developers" that self-publish their games on platforms.

assumptions are at odds with how real-world markets with network effects operate (Section 5.4). Second, I describe how his model, by assuming a single publisher selling a single game to customers who only care about the price of the game and "demand disadvantage" across platforms, fails to account for the complexity of the industry and *assumes*, rather than *demonstrates*, class-wide harm (Section 5.5).

5.1.   Dr. Schwartz's PCM departs from economic reality in fundamental ways, and thus it is not a reliable methodology for establishing the potential impact of the alleged PMFN on proposed class members

167.   **Dr. Schwartz's PCM fails to capture the basic facts of the video game industry and video game distribution platforms.** Economic models are reliable insofar as they are able to make predictions that are consistent with reality.[223] Without a model that appropriately captures relevant aspects of the real world, Dr. Schwartz cannot make reliable predictions about how changes from the as-is world to the but-for world would impact economic outcomes. This renders his methodology unreliable for establishing harm to the proposed class.

168.   Exhibit 6 summarizes two important facts of the video game industry that demonstrate how Dr. Schwartz's PCM fails to make reliable predictions about the real world. First, **Dr. Schwartz's PCM predicts negative profits for the publisher on Steam in the as-is world.** Second, his model predicts **unrealistically high marginal costs for the publisher.** These predictions **are at odds with the economic reality of the video game industry. The fact that Dr. Schwartz's model cannot even predict these basic facts in the as-is world means that it is not reliable for making predictions about the but-for world.**

169.   Dr. Schwartz conducts an empirical analysis of his PCM by using two approaches, and as summarized in Exhibit 6.[224] Under both approaches, **Dr. Schwartz's PCM predicts**

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[223]   Jeffrey M. Perloff, *Microeconomics*, Seventh Edition, (Boston: Pearson Education, 2015), p. 4 ("A good model makes sharp, clear predictions that are consistent with reality."); Dani Rodrik, *Economic Rules: The Rights and Wrongs of the Dismal Science*, (New York: W.W. Norton & Company, 2015), p. 14 ("What makes a model useful is that it captures an aspect of reality. What makes it indispensable, when used well, is that it captures *the most relevant aspect of reality in a given context.*").

[224]   He does so by making specific assumptions about the values of some of the parameters in the Boik and Corts model and inferring the value of the remaining parameters to describe the as-is world. In particular, Dr. Schwartz uses assumptions about the prices of games on each of the two platforms, the platforms' revenue shares, and the publisher's sales on each platform as his "real world" inputs. He plugs these inputs into the Boik and Corts model, and then he calculates the model's predictions about economic outcomes, such as revenue shares and the

negative profits for the publisher in the as-is world. As I discuss further below, this prediction contradicts the reality of the video game industry and video game distribution platforms: thousands of publishers choose to operate on Steam, and this would not be the case if they earned negative profits on Steam.

Exhibit 6
Dr. Schwartz's PCM fails to capture important facts of the video game industry in the real world

| | | Predictions by Dr. Schwartz's PCM[1] | |
	Video game industry in the real world[2]	First Approach[3]	Second Approach[4]
1. The publisher's profits are positive	Yes	No	No
2. The publisher's marginal costs are low	Yes	No	No

Source: Schwartz Report and backup materials
Note:
[1] Dr. Schwartz adopts the stylized theoretical model by Boik and Corts for his empirical analysis of his PCM. He uses his empirical analysis to make predictions about the economic outcomes in the video game industry with two different approaches. These columns present Dr. Schwartz's predictions about the as-is world.
[2] As I discuss in this section, firms base strategic decisions on economic profits, and one would not expect to observe publishers selling their games on Steam if they were earning negative economic profits on Steam in the long run (see footnotes 231 and 233). In the real world, publishers do sell their games on Steam, and doing so contributes positively to their financial performance (see footnote 234). Further, both the academic and public discourse have concluded that marginal costs associated with digital goods (e.g., video games) are low (see footnote 242).
[3] For his first approach to his empirical analysis of his PCM, Dr. Schwartz fully adopts Boik and Corts's assumptions regarding the rules of behavior of platforms, games, publishers, and consumers. Dr. Schwartz refers to this as the "interior solution" of his PCM.
[4] For his second approach to his empirical analysis of his PCM, Dr. Schwartz makes an additional set of assumptions that deviate from the rules of behavior of platforms, games, publishers, and consumers in the Boik and Corts paper. Dr. Schwartz refers to this as the "corner solution" of his PCM.

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170.   In **his first approach to his empirical analysis of his PCM,** Dr. Schwartz fully adopts Boik and Corts's assumptions regarding the rules of behavior of platforms, games, publishers, and consumers.[225] This includes the assumption—not true for many games in the real

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profits of market participants in the as-is world. He further assumes that, once the as-is world is established, some of his assumptions regarding the parameters in the Boik and Corts model can be changed (e.g., whether a PMFN is present), while other economic relationships will remain the same (e.g., EGS's "demand disadvantage"). He uses these ad-hoc assumptions to predict economic outcomes in the but-for-world, absent the alleged PMFN. See Schwartz Report, Appendix A.1.

225   In particular, Dr. Schwartz adopts the model solution described by the equations in Appendix D of the Boik and Corts paper and calls this first approach an "interior solution." See Schwartz Report, ¶¶ A3–A17 ("we can invert the equations from the Boik and Corts model to provide model parameters ... for interior solutions of the model."). For this set of equations, Boik and Corts assume that the publisher *always* offers the game on both platforms, an assumption that Dr. Schwartz also makes by adopting their equations. See Boik and Corts (2016), pp. 133–134.

world—that the publisher always offers the game on both Steam and EGS.[226] However, under this first approach, **Dr. Schwartz's PCM predicts that publishers' profits on Steam are *negative* in the as-is world.**[227] Dr. Schwartz recognizes that this prediction is contrary to economic intuition and industry facts.[228] Further, in his deposition, he acknowledged the negative profits predicted by his PCM in the as-is world and testified that he is referring to economic profits rather than accounting profits.[229] However, Dr. Schwartz does not consider that the difference between economic profits and accounting profits is that economic profits include opportunity costs—that is, potential profits that could be earned on alternative platforms.[230] Firms base their strategic decisions, such as exit, on

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[226]   This set of equations that Dr. Schwartz adapts from Boik and Corts for his first approach (see Boik and Corts (2016), pp. 133–134) corresponds to the model solution of Boik and Corts that assumes a timing of the game under which publishers do not have the option to choose the platforms, and they are assumed to *always* publish the game on both platforms. See Boik and Corts (2016), p. 111 ("The timing is as follows. The platforms simultaneously choose whether to require PMFN policies. They then simultaneously choose transaction fees f_i. The seller sets prices p_i, abiding by the terms of any PMFN policies.").

[227]   Schwartz Report, ¶ A17 ("[T]he combined seller economic profits on both platforms when the PMFN is in place are negative. This indicates that sellers with these costs facing these prices and fees would choose not to sell at all over operating in this market.").

[228]   Schwartz Report, ¶ A2 ("While this solution may suffice for some cases, as I discuss below, the case specific estimates give model parameters that imply seller profits are negative on Steam. This means that Steam's profit maximization problem is not correct, since it is based on the assumption that sellers will sell on the platform; however, with negative economic profits, sellers would stop selling on Steam and instead pursue their next best alternative").

[229]   Schwartz Deposition, pp. 265:16–268:3 ("Q. Your model came up with some negative prices; isn't that right? A. Can you show me what you're looking at? Q. Yeah, take a look at paragraph two hundred seventy-four, table three. I should say profits, not prices, sorry. A. You're talking about the calibration, your table three? Q. Yes. A. It shows that with the PMFN, the seller profits per unit are negative but positive on the other platform and that economic profits on Steam are negative and offset precisely by positive economic profits on EGS. Q. So in your model, the publishers would lose ███████████ for each game they sell on Steam; right? A. Yes Mr. Leray: I object to form. Are we talking economic or accounting profits? Q. Have you looked to see what publishers' actual profits are for selling games on Steam in the real world? A. Well, you're talking about accounting profits and what we're talking about here are economic profits. Q. Well, according to table three, seller's economic profits for selling games on Steam in the aggregate are minus ██████; right? A. Well, it's in the ██████ Q. Times, right, ██████ So that's ██████ of aggregate negative profits from selling games on Steam; right? A. Economic profits. Q. Okay. And have you done any investigation of what publishers' actual economic profits are from selling games on Steam in the real world? A. There is limited data to calculate even accounting profits, much less economic profits. Q. So I take it you did not investigate that question? A. Investigated but could not do any calculation. And these results are actually completely intuitive given the structure of the PMFN. Because negative economic profits does not mean negative accounting profits. It does not mean that they are losing money on an accounting basis. It means that they are losing money based on a measure of economic profits, which is a different notion from accounting profits."). Further, Dr. Schwartz claimed that his result of negative economic profits is "completely intuitive." See Schwartz Deposition, pp. 265:16–267:19.

[230]   See N. Gregory Mankiw, *Principles of Economics*, Eighth Edition, (Boston: Cengage Learning, 2018), p. 250 ("An economist measures a firm's **economic profit** as the firm's total revenue minus all the opportunity costs (explicit and implicit) of producing the goods and services sold. An accountant measures the firm's **accounting profit** as the firm's total revenue minus only the firm's explicit costs."). Publishers derive value from selling their games and thus face non-zero opportunity costs associated with not switching away from Steam and EGS to alternative platforms (e.g., GOG or Microsoft Store). See David A. Besanko and Ronald R. Braeutigam, *Microeconomics*, Fourth Edition, (Hoboken: John Wiley & Sons, 2011), p. 247 ("The economist's notion that cost is the value of sacrificed opportunities is based on the concept of opportunity cost … The opportunity cost of a particular alternative is the payoff associated with the *best of the alternatives that are not chosen*.").

economic profits—which include opportunity costs.[231] Therefore, if publishers were earning negative economic profits on Steam, one would expect to observe them exiting Steam and instead moving to alternative distribution platforms where they could earn positive economic profits. This contradiction of observed firm behavior by Dr. Schwartz's PCM indicates that his PCM is inherently mis-specified.[232] Given that Dr. Schwartz's PCM only models a single publisher, if that publisher's profit on Steam were negative, then one would not see *any* publisher selling games via Steam.[233] In the real world, we observe that publishers *do* sell their games on Steam, and that selling games on Steam contributes positively to publishers' financial performance.[234]

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[231]   N. Gregory Mankiw, *Principles of Economics*, Eighth Edition, (Boston: Cengage Learning, 2018), pp. 250–251 ("Economic profit is an important concept because it motivates the firms that supply goods and services. As we will see, a firm making positive economic profit will stay in business. It is covering all its opportunity costs and has some revenue left to reward the firm owners. When a firm is making economic losses (that is, when economic profits are negative), the business owners are failing to earn enough revenue to cover all the costs of production. Unless conditions change, the firm owners will eventually close down the business and exit the industry. To understand business decisions, we need to keep an eye on economic profit.").

[232]   Dani Rodrik, *Economic Rules: The Rights and Wrongs of the Dismal Science*, (New York: W. W. Norton & Company, 2015), pp. 16–17 ("Models … are useful because they tell us precisely what the likely outcomes depend on. Consider some important examples. Does the minimum wage lower or raise employment? The answer depends on whether individual employers behave competitively or not (that is, whether they can influence the going wage in their location). Does capital flow into an emerging-market economy raise or lower economic growth? It depends on whether the country's growth is constrained by lack of investable funds or by poor profitability due, say, to high taxes. Does a reduction in the government's fiscal deficit hamper or stimulate economic activity? The answer depends on the state of credibility, monetary policy, and the currency regime. The answer to each question depends on some critical feature of the real-world context. Models highlight those features and show how they influence the outcome … But these conclusions are true only to the extent that their critical assumptions—the features of the real world identified above—approximate reality. When they don't, we need to rely on models with different assumptions.").

[233]   See, e.g., Hal R. Varian, *Intermediate Microeconomics: A Modern Approach*, Seventh Edition, (New York: W. W. Norton & Company, 2005), p. 403 ("If a firm is making losses in the long run, there is no reason to stay in the industry, so we would expect to see such a firm *exit* the industry, since by exiting from the industry, the firm could reduce its losses to zero."); Jeffrey Church and Roger Ware, *Industrial Organization: A Strategic Approach*, (Boston: McGraw-Hill, 2000), p. 21 ("[W]ithout exit barriers, negative economic profits mean that firms will exit since their factors of production can, and will, be profitably transferred to other industries.").

[234]   See, e.g., Activision Blizzard, Inc., SEC Form 8-K for period ended December 31, 2022, filed on February 6, 2023, p. 4 ("Activision segment revenue and operating income grew approximately 60% year-over-year in the fourth quarter, driven by the performance of Call of Duty across console, PC and mobile. Following its October launch, Call of Duty: Modern Warfare II delivered the highest opening-quarter sell-through in franchise history. The strong performance was broad-based, and digital sales were particularly robust on PC and in Asia-Pacific after Activision expanded distribution of the title to Steam's PC digital storefront."); The Motley Fool, "Take-Two Interactive Software Inc (TTWO) Q4 2020 Earnings Call Transcript," May 21, 2020, available at https://www.fool.com/earnings/call-transcripts/2020/05/21/take-two-interactive-software-inc-ttwo-q4-2020-ear.aspx, accessed on May 3, 2024 ("Borderlands 3, the latest installment in our genre defining shooter looter series, outperformed our expectations in the fourth quarter and the title is now sold in over 10 million units, up 50% over Borderlands 2 in the same period. On March 13, Borderlands 3 was released on an array of PC retailers, including [S]team sales of the game exceeded our projections. … Borderlands 3's monthly active users have steadily climbed in each month during the fourth quarter, and in March, with the largest influx of new players since the launch due to its release on [S]team."); Chaim Gartenberg, "EA Games are Returning to Steam Along with the EA Access Subscription Service," *The Verge*, October 29, 2019, available at

171. Rather than taking his model's counterintuitive prediction of negative profits as a reason to reconsider his model's applicability to the video game industry, Dr. Schwartz instead estimates his model a second time. To do so, he uses a **second approach** that relies upon a different set of assumptions.[235] Strikingly, Dr. Schwartz assumes that: (i) if the single game in his model is removed from Steam, EGS will then become the *only* remaining platform in the entire video game industry that could possibly offer the game; and (ii) Steam will set platform fees to make the publisher completely indifferent between offering the game on Steam and EGS versus only having the option to offer the game on EGS.[236] This assumption is at odds with the reality of the video game industry.[237] Dr.

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https://www.theverge.com/2019/10/29/20937055/ea-games-steam-access-subscription-service-pc-storefront-jedi-fallen-order-sales, accessed on May 3, 2024 ("EA will start releasing games on Steam again, after it moved away from the popular PC game marketplace in 2011 in favor of its Origin store and launcher. … 'At the core, we are game makers, and our aspiration is to connect as many people as we can to the great games that we built and make it as frictionless as possible for them to do that,' explained Mike Blank, senior vice president at EA. 'So with more players playing more games and more platforms, frankly, we want to be where the players are.' In EA's case, that means Steam."); Igor Bonifacic, "Ubisoft is Bringing 'Far Cry 6' and Three Other Recent Games to Steam," *Engadget*, April 22, 2023, available at https://www.engadget.com/ubisoft-is-bringing-far-cry-6-and-three-other-recent-games-to-steam-204545630.html, accessed on May 10, 2024 ("As for the company's decision to return to Steam, Ubisoft has only said it's 'constantly evaluating how to bring our games to different audiences wherever they are,' a statement that suggests the size of Valve's userbase may outweigh the value of sharing a smaller portion of sales with a partner like Epic."); Wes Fenlon, "Game Devs Praise Steam as a 'Democratic Platform' That 'Continues to be Transformative' for PC Gaming Today," *PC Gamer*, April 26, 2024, available at https://www.pcgamer.com/gaming-industry/game-devs-praise-steam-as-a-democratic-platform-that-continues-to-be-transformative-for-pc-gaming-today, accessed on May 10, 2024 ("Slay the Spire co-creator Casey Yano credited Steam with making it possible for tiny indie teams like his to be able to make a living off of their games. 'I made a Flash game way back when and I think I made $20,' he said. '[The store] was like 'that's not enough money, we're not even gonna send you a check.' But Steam came along and it was like, whoa, maybe some people can actually make a livable wage from this. I wouldn't even have a job' … Warframe creative director Rebecca Ford credits Steam as 'the thing that still allows me to have a job.' 'We launched on Steam in open beta in March 2013… and it was transformative for us and continues to be,' she said."). In 2022, Snail, Inc., was earning over 30 percent of its net revenue from games sold on Steam. See Snail, Inc., SEC Form 10-Q for period ended September 30, 2022, filed on December 15, 2022, p. 27 ("Our net revenues through our top platform providers as a proportion of our total net revenue for the three months ended September 30, 2022 and 2021 and the nine months ended September 30, 2022 and 2021 were as follows: Three Months ended September 30, 2022 … (in millions) … Valve Corporation (Steam) $5.1 … Total $15.6 … Nine months ended September 30, 2022 … (in millions) … Valve Corporation (Steam) … $17.9 … Total … $59.1.").

[235]   Dr. Schwartz recognizes that if the publisher earns negative profits on Steam, then the publisher would turn to her next best alternatives (i.e., either exit the market or sell only on EGS). Such a decision by the publisher cannot be captured by Dr. Schwartz's first approach to his PCM. As such, he introduces a second approach for his empirical analysis of his PCM, which he labels as a "corner solution." For this second approach, he allows for the publisher to make the decision of whether to offer the game on both platforms (i.e., both Steam and EGS), on only EGS, or completely exit. See Schwartz Report, ¶¶ A18–A34.

[236]   Schwartz Report, ¶ 18 ("In the above scenario, sellers would exit the market or just sell on EGS. To avoid this, Steam would lower their fees until sellers are just indifferent between selling on Steam and their next best option. What their next best option is depends on the demand parameters of the model. One option the seller has is to exit the market entirely and pursue their next best option, earning zero economic profits (the definition of zero economic profits is the profits at the firm's next best option). The second option is to avoid the PMFN by selling only to EGS. This may seem like an attractive option; however, it would mean the seller sells to the other platform as a (now) monopolist."). See also Schwartz Report, ¶¶ A18–A28.

[237]   See Wes Fenlon and Tyler Wilde, "PC Game Storefronts Compared: What You Need to Know about Retailers and Resellers," *PC Gamer*, July 12, 2019, available at https://www.pcgamer.com/pc-game-storefronts-compared-what-you-need-to-know-about-retailers-and-resellers/, accessed on May 3, 2024 ("Most games can be found on one

Schwartz's PCM continues to make unrealistic predictions about the publisher's profits after he re-estimates his model with these new and unrealistic assumptions. **His PCM continues to predict unrealistic, *negative* profits for the publisher on Steam in the as-is world.**[238] The idea that publishers continue to offer games on both Steam and EGS, even when they earn negative profits on Steam, is dependent upon Dr. Schwartz's assumptions and is at odds with the reality of the video game industry. In the real world, some publishers offer the game only on EGS, while others only on Steam, and yet others in a variety of places; and for those that publish on Steam, the platform generally contributes positively to their financial performance.[239]

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or more of these big three—Steam, GOG, and the Epic store—unless they exist in a standalone launcher, like League of Legends, or are exclusive to a publisher store. For interesting indie and experimental games, definitely bookmark itch.io, too."). Popular games available on multiple platforms include *Fallout 4* (available on Steam, EGS, GOG, the Humble Store, and the Microsoft Store, among others) and *Manor Lords* (available on Steam, EGS, GOG, the humble Store, the Microsoft Store, and through Xbox Game Pass for PC). See Steam, "Fallout 4," available at https://store.steampowered.com/app/377160/Fallout_4/, accessed on May 8, 2024; Epic Games Store, "Fallout 4," available at https://store.epicgames.com/en-US/p/fallout-4, accessed on May 10, 2024; GOG, "Fallout 4: Game of the Year Edition," available at https://www.gog.com/en/game/fallout_4_game_of_the_year_edition, accessed on May 10, 2024; Humble Store, "Fallout 4," available at https://www.humblebundle.com/store/fallout-4, accessed on May 10, 2024; Xbox Store, "Fallout 4 (PC)," available at https://www.xbox.com/en-us/games/store/fallout-4-pc/9p71mb9qcf77, accessed on May 10, 2024; Steam, "Manor Lords," available at https://store.steampowered.com/app/1363080/Manor_Lords/, accessed on May 8, 2024; Epic Games Store, "Manor Lords," available at https://store.epicgames.com/en-US/p/manor-lords-ef795f, accessed on May 10, 2024; GOG, "Manor Lords," available at https://www.gog.com/en/game/manor_lords, accessed on May 10, 2024; Humble Store, "Manor Lords," available at https://www.humblebundle.com/store/manor-lords, accessed on May 13, 2024; Megan Spurr, "Coming to Game Pass: Manor Lords, Another Crab's Treasure, Eiyuden Chronicle: Hundred Heroes, and More," *Xbox Wire*, April 16, 2024, available at https://news.xbox.com/en-us/2024/04/16/xbox-game-pass-april-2024-wave-2/, accessed on May 10, 2024.

[238]   Schwartz Report, Table 3, p. 160. The predicted profits for game publishers are negative ███████ on Steam and positive ████████ on EGS. That is, according to Dr. Schwartz's PCM, game publishers on Steam incur a loss of ████████ on Steam and earn exactly the same amount of profit on EGS, and thus earn a total profit of zero. See also Schwartz Report, ¶¶ 277–278 ("I note that comparing per-unit prices to consumers, fees to developers, or developer profits within a platform from the PMFN scenario to the non-PMFN scenario is an incomplete analysis... I also note that the sellers' economic profits on Steam are negative when the PMFN is in place (but seller profits across both platforms are zero)."). Dr. Schwartz's PCM not only predicts negative profits for the publisher on Steam in this second approach, but it also fails to find the model parameters that best equate model outcomes with the values he chooses to represent the "real world" data. See Workpaper 8.

[239]   As of 2023, EGS offered 2,900 total titles, while 14,532 games were released on Steam in 2023 alone. See Epic Games, "Epic Games Store 2023 Year in Review," February 16, 2024, available at https://store.epicgames.com/en-US/news/epic-games-store-2023-year-in-review, accessed on May 3, 2024 ("Our catalog expanded significantly in 2023, with publishers and developers bringing over 1,300 new PC titles to the store. The Epic Games Store now offers over 2900 titles, increasing the games available to our audience by 88% since 2022."); James Ratcliff, "A Record Number of Games Were Released on Steam in 2023," *Game Rant*, January 5, 2024, available at https://gamerant.com/games-released-steam-2023-record-number, accessed on May 3, 2024 ("According to figures logged by SteamDB, 14,532 Steam games were released in 2023, which is an increase of nearly 2,000 from 2022."). See also SteamDB, "Steam Game Releases by Year," available at https://steamdb.info/stats/releases, accessed on May 10, 2024. Other examples of games that are listed on non-EGS platforms include World in Conflict: Complete Edition, SWAT 4: Gold Edition, Unsorted Horror, Caves of Qud, and Dwarf Fortress, among others. See GOG, "Only on GOG," available at https://www.gog.com/en/promo/only_on_gog, accessed on May 10, 2024 ("Beloved classics that made their mark on how gaming looks like today. Available only on GOG."); Itch.io, "Top Paid Games," available at

172.   In addition to finding nonsensical negative profits, Dr. Schwartz's PCM also predicts unrealistically high marginal costs for each copy of a game sold on Steam. This is another indication that his PCM cannot represent the economic behavior and outcomes of the video game industry observed in reality. **Dr. Schwartz's PCM predicts that the publisher has marginal costs in the as-is world that are at least 75 percent of its sales prices.**[240] This means that, for the $60 game price that Dr. Schwartz assumes in his model, the publisher would have to pay more than $45 in costs per game copy sold, even before considering the platform revenue share.[241] Dr. Schwartz provides no real-world evidence or economic rationale for why the marginal costs of a digital good would be so high. In reality, selling a game that has already been developed and marketed to one additional customer on Steam or EGS involves very little cost to the publisher; both the academic and public discourse have concluded that marginal costs associated with such digital goods are low.[242]

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https://itch.io/games/store, accessed on May 3, 2024; Mike Klubnika, "Unsorted Horror," *Itch.io*, available at https://mikeklubnika.itch.io/unsorted-horror, accessed on May 3, 2024; Kitfox Games, "Games," available at https://www.kitfoxgames.com/en, accessed on May 3, 2024.

[240]   See Schwartz Report, Table A.4, p. A11, in which Dr. Schwartz's marginal cost parameter for the publisher ("c_s") is equal to 0.75. Upon reviewing Dr. Schwartz's backup materials, I found that Dr. Schwartz incorrectly labels Table A.3 and Table A.4 in his report. Table A.3 corresponds to the calculated model parameters in the high EGS monopoly demand, and Table A.4 corresponds to the calculated model parameters in the low EGS monopoly demand; this Table A.4 is used to calculate outcomes in Table 3. See Dr. Schwartz's Backup, "corner_ld.csv," "corner_hd.csv." Note that the price of the game in the as-is world on Steam ("p_i^2") is normalized to 1, implying that marginal costs are 75 percent of the game's sale price on Steam. See Schwartz Report, p. A11, footnote 10. Further, I note that the 75 percent marginal costs discussed here are before considering revenue shares collected by the platform. Factoring in revenue sharing by the platform would make the implied marginal costs of the publisher even higher, which could potentially result in a more than 100 percent and thus unrealistically high marginal cost. For the empirical analysis of his first approach, Dr. Schwartz gets an even higher value of marginal costs for the publisher that is equal to 79 percent of the game price. See Dr. Schwartz's Backup, "09a_interior.R."

[241]   As I discuss in Section 4.3.3, pricing video games is a complex process involving many factors. Dr. Schwartz fails to take this into account when assuming in his PCM that the publisher sells the game at the same price across the two platforms (i.e., $60 per copy of the game on both Steam and EGS). See Schwartz Report, ¶ 273.

[242]   University of Minnesota Libraries, "Understanding Media and Culture: 13.6," available at https://open.lib.umn.edu/mediaandculture/chapter/13-6-globalization-of-media/, accessed on May 3, 2024 ("As discussed above, the low marginal costs of media mean that reaching a wider market creates much larger profit margins for media companies. Because information is not a physical good, shipping costs are generally inconsequential."); Hal R. Varian, Joseph Farrell, and Carl Shapiro, *The Economics of Information Technology: An Introduction*, (Cambridge: Cambridge University Press, 2004), p. 25 ("We have already noted that many information- and technology-related businesses have cost structures with large fixed costs and small, or even zero, marginal costs."); Yinliang Tan, Janice E. Carrillo, and Hsing Kenny Cheng, "The Agency Model for Digital Goods," *Decision Sciences*, 47(4), 2016, pp. 628–660 at p. 631 ("Unlike the physical goods market which always faces the risk of a mismatch between the random demand and supply, the demand of the digital goods can always be perfectly fulfilled. As a result, there is no inventory decision to be made in the digital goods market. Further, the marginal production cost of the digital goods is negligible."); Joseph Politano, "Video Games, Price Architecture, and the Zero Marginal Cost Revolution," *Apricitas Economics*, August 28, 2021, available at https://www.apricitas.io/p/video-games-price-architecture-and, accessed on May 3, 2024 ("Video games are on the forefront of new pricing, production, and distribution models that are shifting the way we pay for goods and services. Digital games, in some cases, have zero

5.2.   Dr. Schwartz relies on a stylized theoretical model that is not designed to capture the empirical complexities of the video game industry

173.   Dr. Schwartz adopts the stylized theoretical model developed by Boik and Corts (2016) and uses it for a purpose—empirical analysis—for which it was not designed. As I discuss in this section, the model that Boik and Corts proposed is a stylized theoretical model. It was originally developed and thus is well suited only for developing intuition regarding the economic forces surrounding PMFN policies. It is not a model that was designed to— or is well suited to—empirically quantify the effects of such specific policies in the real world.[243] While stylized theoretical models are common in economics and can build useful intuition, economists generally prefer richer models for the purposes of empirical real-world analyses of complex industries, such as the video game industry.[244] Richer models are better equipped to capture the complex real-world interactions between economic actors. Therefore, such models can better capture important industry facts and economic outcomes that are salient to the relevant questions.[245] Dr. Schwartz's misuse of a stylized theoretical model outside its intended setting and purpose renders his predictions of the but-for world conceptually flawed and unreliable.

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marginal cost — the cost for a producer to distribute an additional game file is $0, unlike the usually positive marginal cost for physical goods. ... The marginal cost of selling an additional video game as a downloadable file is functionally zero, especially if the file is hosted on a third-party service like Steam or the Google Play Store.").

[243]   The model in Boik and Corts is not designed to empirically analyze the effects of an alleged PMFN, but rather to theoretically demonstrate the economic forces at work when generic platforms choose whether to adopt PMFN policies. See Boik and Corts (2016), pp. 109–110 ("... to our knowledge no formal theoretical analysis of the effect of PMFN agreements on entry or choice of product position exists. ... We make a significant contribution by explicitly considering the fee and price effects of PMFN policies in a more general setting in which aggregate demand can be downward sloping and by being first to analyze formally the effects of PMFN agreements on entry and positioning decisions.").

[244]   See, e.g., Dani Rodrik, *Economic Rules: The Rights and Wrongs of the Dismal Science*, (New York: W.W. Norton & Company, 2015), p. 17 ("Economic models ... are simple and are set in abstract environments. They make no claim to realism for many of their assumptions. While they seem to be populated by real people and firms, the behavior of the principal characters is drawn in highly stylized form."). Further, a popular family of rich empirical models in economics—particularly within the field of industrial organization—is "structural" models. See, e.g., Hamish Low and Costas Meghir, "The Use of Structural Models in Econometrics," *Journal of Economic Perspectives*, 31(2), 2017, pp. 33–57 at pp. 33–34 ("The central payoff of a structural econometric model is that it allows an empirical researcher to go beyond the conclusions of a more conventional empirical study that provides reduced-form causal relationships. Structural models define how outcomes relate to preferences and to relevant factors in the economic environment, identifying mechanisms that determine outcomes. Beyond this, they are designed to analyze counterfactual policies, quantifying impacts on specific outcomes as well as effects in the short and longer run."), 35 ("Structural models are the foundation for empirical work in industrial organization..."), 54 ("Structural economic models are at the heart of empirical economic analysis, offering an organizing principle for understanding data, for testing theory, for analyzing mechanisms through which interventions operate, and for simulating counterfactuals.").

[245]   See, e.g., Hamish Low and Costas Meghir, "The Use of Structural Models in Econometrics," *Journal of Economic Perspectives*, 31(2), 2017, pp. 33–57 at pp. 33–35, 54.

174.   Specifically, the model by Boik and Corts is insufficient to capture the empirical realities of the video game industry for many reasons including because in this model it is assumed that there is only one publisher, only one game, only one incumbent platform, only one potential entrant platform, no network effects, no customer pricing or discounts, and no strategies that take time for the platforms or publisher to implement.[246] Therefore, the model cannot account for, for instance, the effect of a PMFN on the publisher's profits.[247]

175.   Instead of such stylized theoretical models, economists generally use rich empirical models to make quantitative predictions about the but-for world, as I mentioned above.[248] Such models aim to quantify the predictions of theoretical models that have assumptions in line with the core facts of the industry they capture.[249] In fact, one of the primary purposes of the field of *econometrics* is to develop empirical modeling methods that enable testing of theoretical models.[250] These models are often designed to

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[246]   See Boik and Corts (2016), pp. 110–111, 117 ("A single seller S sells its products to buyers through one or both of two platforms... the seller is effectively a simple multiproduct monopolist (where the underlying product sold through each of the platforms is thought of as a distinct product) ... it is possible that platforms may rebate some fraction of those fees directly to consumers and thus face a two-sided pricing problem. Unfortunately, introducing rebates to our model creates a difficult and intractable setting with multiple equilibria with or without PMFN agreements.").

[247]   Boik and Corts themselves recognize that their stylized theoretical model is based on a series of simplifying assumptions that would need to be reconsidered if one aimed to apply their model to such a complex industry as the video game industry. See Boik and Corts (2016) at p. 128 ("full analysis of whether the encouragement, deterrence, or skewing of entry increases or decreases social welfare requires much more structure regarding both demand and costs and is beyond the scope of this paper.") Publisher profits are a component of the aforementioned "social welfare" on which the Boik and Corts model does not take a stand regarding the impact of a PMFN.

[248]   Sam Ouliaris, "What Are Economic Models?" *Finance & Development*, 48(2), 2011, pp. 46–47 at p. 46 ("There are two broad classes of economic models—theoretical and empirical. Theoretical models seek to derive verifiable implications about economic behavior under the assumption that agents maximize specific objectives subject to constraints that are well defined in the model (for example, an agent's budget). They provide qualitative answers to specific questions ... In contrast, empirical models aim to verify the qualitative predictions of theoretical models and convert these predictions to precise, numerical outcomes.").

[249]   Peter C. Reiss and Frank A. Wolak, "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," in *Handbook of Econometrics*, Volume 6A, eds. James J. Heckman and Edward A. Leamer, (Amsterdam: Elsevier B.V., 2007), pp. 4277–4415 at p. 4281 ("Today economists refer to models that combine explicit economic theories with statistical models as *structural econometric models* ... While structural econometric models have the logical advantage of detailing the economic and statistical assumptions required to estimate economic quantities, the fact that they impose structure does not automatically make them sensible. To be convincing, structural models minimally must be: (1) flexible statistical descriptions of data; (2) respectful of the economic institutions under consideration; and, (3) sensitive to the nonexperimental nature of economic data."), p. 4290 ("All economic theories contain assumptions that are not easily relaxed. While theorists sometimes have the luxury of being able to explore stylized models with simplifying assumptions, structural econometric modelers have to worry that when they use stylized or simplifying assumptions they will be dismissed as arbitrary, or worse: insensitive to the way the world 'really works'.").

[250]   Gangadharrao S. Maddala, *Introduction to Econometrics*, Second Edition, (New York: Macmillan Publishing Company, 1992), pp. 1–4 ("What we mean by *econometrics* is: The application of statistical and mathematical methods to the analysis of economic data, with a purpose of giving empirical content to economic theories and

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incorporate data from a broad set of data sources, and to estimate rules of behavior of different economic actors in a way that is consistent with the data.[251] By using a stylized theoretical model that makes assumptions that oversimplify these rules of behavior, as opposed to a richer model typically used in empirical work, Dr. Schwartz has not only *assumed* that the alleged PMFN deterred entry, but has also *assumed* that it leads to class-wide harm. As such, his conclusions about the impact and the alleged harm of the alleged PMFN on proposed class members are conceptually flawed and unreliable.

5.3.   Dr. Schwartz's PCM does not and cannot capture the complexities of the video game industry

176.   As I explained in Section 5.1, Dr. Schwartz's PCM makes predictions about the as-is world that do not accurately characterize the real world. This is because—as I discussed in Section 5.2—Dr. Schwartz misuses a stylized theoretical model adopted from Boik and Corts (2016), and applies this model to the video game industry, which is much more complex than the simplified interactions specified in the Boik and Corts model. In this section, I explain **the important aspects of the video game industry that Dr. Schwartz's PCM fails to capture.**

177.   **First, Dr. Schwartz's PCM does not include network effects, and thus cannot be used to model two-sided platforms like those in the video game industry.**[252] Dr. Schwartz follows Boik and Corts in assuming away network effects—as he does in his damages model as well—despite the fact that, in other parts of his report, he recognizes that video game

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verifying them or refuting them ... An *economic model* is a set of assumptions that approximately describes the behavior of an economy (or a sector of an economy). An *econometric model* consists of ... a set of behavioral equations derived from the economic model ... a statement of whether there are errors of observation in the observed variables ... [and] a specification of the probability distribution of the 'disturbances' (and errors of measurement). With these specifications we can proceed to test the empirical validity of the economic model and use it to make forecasts or use it in policy analysis.").

[251]   Hamish Low and Costas Meghir, "The Use of Structural Models in Econometrics," *Journal of Economic Perspectives*, 31(2), 2017, pp. 33–57 at p. 33 ("Structural economic models focus on distinguishing clearly between the objective function of the economic agents and their opportunity sets as defined by the economic environment. The key features of such an approach at its best are a tight connection with a theoretical framework alongside a clear link with the data that will allow one to understand how the model is identified.").

[252]   Boik and Corts acknowledge that their stylized theoretical model would require adjustments to account for the "two-sided pricing problem" of platforms. See Boik and Corts (2016), p. 117 ("[I]t is possible that platforms may rebate some fraction of those fees directly to consumers and thus face a two-sided pricing problem. Unfortunately, introducing rebates to our model creates a difficult and intractable setting with multiple equilibria with or without PMFN agreements."). Dr. Schwartz's PCM adopts this assumption from Boik and Corts where "platforms set a one-sided" revenue share, hence ignoring the network effects. See Schwartz Report, ¶ 246 ("Like Steam and other participants in the relevant market, the platforms set a one-sided, per-transaction fee (f_i) charged to the seller side of the market (game publishers).").

platforms, such as Steam and EGS, are two-sided platforms benefitting from network effects.[253] As discussed in Sections 3.2 and 4.2.4 above, the video game industry faces network effects where platforms offer prices and incentives to both publishers and customers. The lack of network effects in the Boik and Corts model, and thus in Dr. Schwartz's PCM, prevents the new entrant from becoming a stronger competitor relative to the incumbent over time, even when, for instance, it sells more games (and thereby attracts more consumers to the platform).[254] When asked about network effects in his deposition, Dr. Schwartz said he "would have to think about" whether the Boik and Corts model—and importantly his PCM—allow for network effects, stating that it was "an interesting question."[255] Neither model does. In addition, Dr. Schwartz's PCM does not allow for platforms to use growth strategies that develop over time, and it does not consider other dimensions of competition (e.g., specializing in particular kinds of games,

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[253]   Schwartz Report, ¶¶ 30, 57 ("Steam is a platform. Economists define a platform as an entity that facilitates interaction between one or more groups of users, like consumers and producers. Here, Steam connects game publishers/developers to game players, facilitating transactions between the two. Digital platforms, like Steam, take the form of 'website[s], app[s] or other digital venue[s] that interact commercially with one or more group of users.' While platforms that connect groups of users directly to people like them are called 'one-sided' or 'single-sided' platforms, platforms such as Steam, that connect two or more different groups of users in a physical or virtual space are called two-sided or multi-sided platforms. Platforms often exhibit network effects. Economists define network effects as an attribute of a product or platform, in which the product or platform's value changes as the number of users of that product or platform changes. 'Direct' or 'same-side' network effects exist if, as more users join a platform, the value of that platform increases to all users on that same side of the platform. 'Indirect' or 'cross-side' network effects exist if, as more users of a different group join a platform, the value of the platform increases to the first group of users... Steam is a two-sided platform, and these market definition tools must be applied to both sides of the platform to properly determine the relevant market."). Further, even Steam itself has been the subject of academic research concerning network effects. See José Tudón, "Distilling Network Effects from Steam," *Quantitative Marketing and Economics*, 20, 2022, pp. 293–312.

[254]   Dr. Schwartz himself recognizes that platforms would grow in the presence of network effects, but he still fails to incorporate this in his PCM. See Schwartz Report, ¶ 309 ("Once those competitors had succeeded in building network effects, they would then become more attractive options for publishers of smaller games and those smaller games would in turn be more attractive to competitors. In such a competitive context, Steam would likely face pressures to both (1) further lower its commission rate for the largest games that entered Steam's tiered commission structure and (2) lower its commission rates for smaller games that did not enter Steam's tiered commission structure"). Network effects have been a focal point of academic literature studying platform competition. See, e.g., Carmelo Cennamo and Juan Santalo, "Platform Competition: Strategic Trade-Offs in Platform Markets," *Strategic Management Journal*, 34(11), 2013, pp. 1331–1350 at p. 1331 ("The hallmark of the existing literature on platform competition is the concept of network effects, wherein consumers place a higher value on platforms with a larger number of users."). Further, network effects can lead to a platform's growth over time. See Bruno Jullien, Alessandro Pavan, and Marc Rysman, "Two-Sided Markets, Pricing, and Network Effects," *Handbook of Industrial Organization*, 4(1), 2021, pp. 485–592 at p. 488 ("As a product with network effects diffuses into the market, it becomes more valuable and drives further adoption. Indirect network effects thus lead to a feedback loop as more participants on each side of the platform find it more valuable to adopt and use the platform when they expect the other side to attract more users.").

[255]   Schwartz Deposition, pp. 259:6–260:3 ("Q. And you and [Boik and Corts] assumed, for purposes of the model, no network effects; correct? ... The Witness: Where in my report are you pointing to where I say there are no negative effects? I just don't recall. Q. I didn't say negative effects. I said -- A. I said no network effects. Q. I couldn't see in your model or the Boik and Corts paper how any network effects were allowed for. If you think they are, please tell me. A. This is something I'd have to think about. I don't think the Boik and Corts model says anything about network effects, whether they exist or don't. I don't think my implementation does either, but that's an interesting question. That's something I'll have to think about.").

paying publishers to sell their games only on a given platform, offering free games, offering specific features) that platforms typically use to encourage customers to join.[256] Taken together, these assumptions imply that the entrant in Dr. Schwartz's PCM cannot replicate real-world growth strategies commonly seen in this industry. As such, economic outcomes—and the impact of a PMFN on these economic outcomes—are different in Dr. Schwartz's as-is world than they would be in the real world in the presence of network effects, rendering his PCM unreliable for predicting outcomes in the but-for world.

178.   **Second, Dr. Schwartz's model does not account for differentiated publishers, consumers, and platforms in the video game industry.** In the real world, the video game industry has multiple and differentiated publishers that sell multiple and differentiated games to multiple and differentiated consumers on multiple and differentiated platforms. By contrast, Dr. Schwartz's PCM assumes only one publisher selling only one game via only two platforms to consumers who, beyond price and "demand disadvantage," do not care about any characteristics of the game or platforms. In particular, Dr. Schwartz's PCM makes four sets of assumptions.

  i.   **The PCM assumes that there is a single publisher that sells a single game on the two potential platforms.**[257] In reality, there are tens of

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[256]   See Itch.io, "About itch.io," available at https://itch.io/docs/general/about, accessed on May 6, 2024 ("itch.io is an open marketplace for independent digital creators with a focus on independent video games…itch.io is a collection of some of the most unique, interesting, and independent creations you'll find on the web."); Andy Chalk, "Epic Goes on the Hunt for Even More Exclusives with a New Program Offering Bigger Payouts to Smaller Studios," *PC Gamer*, August 23, 2023, available at https://www.pcgamer.com/epic-goes-on-the-hunt-for-even-more-exclusives-with-a-new-program-offering-bigger-payouts-to-smaller-studios/, accessed on May 6, 2024 ("The Epic Games Store has grown into a successful, major digital storefront since its launch in 2018 in large part due to exclusive game releases: Epic has used the massive financial success of Fortnite to pay publishers in advance to launch games on its storefront, and more to the point, not launch them on Steam, at least temporarily. It's managed to attract some big names over the years, like Borderlands 3, Control, Hitman 3, and Kingdom Hearts"); Epic Games Store, "Free Games," available at https://store.epicgames.com/en-US/free-games, accessed on May 6, 2024 ("Epic Games Store gives you a free game every week. Come back often for the exclusive offers."); Jeffery L. Wilson and Jordan Minor, "GOG.com Review," *PCMag*, July 19, 2023, available at https://www.pcmag.com/reviews/gogcom-for-pc, accessed on May 6, 2024 ("GOG.com (the company formerly known as Good Old Games) is the store to visit if you have a hankering for Alone in the Dark, Baldur's Gate, Freddy Pharkas: Frontier Pharmacist, and other classic PC games from the 1990s and early 2000s. Although GOG.com specializes in retro titles, the company has a progressive outlook in regard to how it delivers content: None of its games feature restrictive digital rights management (DRM). That two-pronged attack has enabled GOG.com to thrive in the Steam-dominated PC gaming marketplace."). Further, academic literature discusses such dynamic pricing behavior in two-sided markets. See, e.g., Marc Rysman, "The Economics of Two-Sided Markets," *Journal of Economic Perspectives*, 23(3), 2009, pp. 125–143 at p. 131 ("Two-sided markets raise questions for dynamic pricing as well. Penetration pricing, such as when an intermediary lowers price early in the product life cycle and raises it after having established a base, is a natural outcome of two-sided markets.").

[257]   Boik and Corts (2016), pp. 110–111 ("A single seller S sells its products to buyers through one or both of two platforms … the seller is effectively a simple multiproduct monopolist (where the underlying product sold through each of the platforms is thought of as a distinct product)"); Schwartz Report, ¶¶ 245–246, 252 ("I apply the

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thousands of publishers in the video game industry that compete with each other for consumers within and across platforms.[258] These publishers have multiple games, and make decisions about game development, marketing, monetization, and pricing by considering players' preferences and choices between the different games and platforms.[259] Therefore, Dr. Schwartz's PCM cannot account for the complex incentives created by multiple publishers interacting strategically, the competitive dynamics this creates between different types of publishers, and for the fact that multiple games are also often owned by the same publisher.[260] Further, the PCM is unable to accurately capture the differences across publishers, their games, their customer bases, their competitive strategies, and—consequently—the differences in their potential response to the alleged PMFN.

ii.   **The PCM assumes that the two platforms' demands differ only by a fixed and persistent "demand disadvantage" faced by the entrant**

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relevant principles from Boik and Corts to construct a model that considers and incorporates the facts and circumstances of this case. Generally, this model closely matches the facts of this case, including the characteristics of Steam and the relevant market. First, the Boik-Corts model considers two platforms.... More formally, like the asymmetric Boik-Corts, my model includes a seller (i.e., the game publisher) who sets its own consumer prices.").

[258]   PCGameBenchmark, "Publishers," available at https://www.pcgamebenchmark.com/publishers, accessed on May 13, 2024 ("There are 68,340 publishers on PCGameBenchmark."); Simon Carless, "Publishers, and Their 'Hidden' Steam Advantage?" *GameDiscoverCo*, September 21, 2022, available at https://newsletter.gamediscover.co/p/publishers-and-their-hidden-steam, accessed on May 13, 2024 ("[H]e and his team went and scraped the data – including all 7,749 publisher & franchise pages [on Steam]."). See also Statista, "Number of Video Game Software Publishing Businesses in the United States from 2013 to 2023," available at https://www.statista.com/statistics/1175328/video-game-software-publishing-businesses/, accessed on May 13, 2024.

[259]   Dr. Schwartz himself acknowledges this in his report. See Schwartz Report, ¶¶ 65–67 ("In making distribution choices, publishers will consider a variety of factors, in addition to the ability of gamers to be able to access and play the game. These include, for example, the size of the user base, the availability of other services from the platform operator, including game development tools, marketing support, and the like... Similarly, other third-party digital PC game distribution platforms advertise and offer such developer benefits...When considering their game distribution options, publishers may consider distributing games through, for example, third-party physical PC game distribution, such as through brick-and-mortar stores; first-party digital PC game distribution, in which the publishers distribute the games themselves; or non-PC game distribution, in which games are written to be played on devices such as consoles or smartphones. For a game publisher, value is realized when gamers have the opportunity to find a game; thus, publishers want to maximize access to their games to PC gamers.").

[260]   See, e.g., Ubisoft, "History of our Projects," available at https://www.ubisoft.com/en-us/company/careers/locations/articles/the-history-of-our-projects, accessed on May 13, 2024 ("Throughout the years, it has released more than 20 titles, ranging from small casual to big open-world games, and covering a wide range of platforms & technologies."); Callum Williams, "Every Rockstar Game Ever Released: A Full History," *IGN*, March 20, 2024, available at https://www.ign.com/articles/all-rockstar-games, accessed on May 13, 2024 ("In total, there have been 47 games released by Rockstar."); PCGameBenchmark, "PC Games Published by Square Enix," available at https://www.pcgamebenchmark.com/pc-games-published-by-square-enix, accessed on May 13, 2024 ("These are 170 PC games published by Square Enix[.]").

platform, which Dr. Schwartz further assumes to be large.[261] This assumption is particularly poorly suited for a two-sided platform like Steam. As noted above, Dr. Schwartz acknowledges that Steam and EGS are two-sided platforms that benefit from direct and indirect network effects, which would not justify a large and fixed "demand disadvantage" that remains persistent after the entry of the competing platforms.[262] Further, Dr. Schwartz's PCM assumes that in the but-for world, EGS would take up a much larger share of the market.[263] The fact that his model's assumptions do not allow the "demand disadvantage" to change with the market share of the competing platform after its entry is inconsistent with the facts of the industry, his own analysis, and academic literature.[264] Dr. Schwartz testified in his

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[261]   Specifically, by following Boik and Corts (2016), Dr. Schwartz assumes that the potential entrant faces a "demand disadvantage" that is captured by parameter "x" in his PCM. This parameter captures the extent to which Steam's competitor platform would face lower demand compared to Steam, for games sold at identical prices on the two platforms. See Boik and Corts (2016), p. 123 ("We also permit the possibility that the entrant has a lower-value offering, which results in a reduction in demand of x>0 for any given prices ... Note that lower x need not reflect an inferior platform in a general sense; it is a platform that faces lower demand at given prices, but this may be accompanied by lower variable or fixed costs that make the entrant quite a viable competitor and a potential contributor to total welfare. Similarly, a lower cost need not make a firm a superior creator of value if it is accompanied by a demand disadvantage."); Schwartz Report, ¶ 253 ("The x term allows for one platform to have a 'lower-value offering, which results in a reduction in demand of x > 0 for any given [consumer] prices[.]'"). More importantly, Dr. Schwartz assumes that this "demand disadvantage" is large, fixed, and persistent. In particular, he uses his market share estimate of ▮ percent (▮▮▮▮ units) for Steam, and he attributes the remaining market share of ▮ percent (▮▮▮▮ units) to EGS, by assuming that this is Steam's only competitor in the entire video game industry. This results in his "demand disadvantage" of ▮ percent (▮▮▮▮ units) for EGS relative to Steam, which he calculates by taking the difference between his assumed market shares of the game sold on Steam and EGS. See Schwartz Report, ¶¶ 254, 273, Table A.4, p. A11.

[262]   Schwartz Report, ¶¶ 30, 57.

[263]   Dr. Schwartz's empirical analysis predicts that in the but-for world, Steam has a market share of ▮ percent and EGS has a market share of ▮ percent. See Schwartz Report, Table 3.

[264]   See, e.g., Carmelo Cennamo and Juan Santalo, "Platform Competition: Strategic Trade-Offs in Platform Markets," *Strategic Management Journal*, 34(11), 2013, pp. 1331–1350 at p. 1331 ("The hallmark of the existing literature on platform competition is the concept of network effects, wherein consumers place a higher value on platforms with a larger number of users. This might be because consumers value direct links with other consumers (direct network effects) or because they anticipate that platforms with more users (a larger installed base) will also offer a wider number and variety of complementary products and services (indirect network effects)..."). Further, Shankar and Bayus (2003) and Lee (2013) discuss the importance of network effects in the context of the video game industry. See Venkatesh Shankar and Barry L. Bayus, "Network Effects and Competition: An Empirical Analysis of the Home Video Game Industry," *Strategic Management Journal*, 24(4), 2003, pp. 375–384 at p. 377 ("The network effects associated with a large customer base of hardware users are very important in [the home video game] industry since they are typically associated with increased complementary products (e.g., software titles, licensed products, television cartoon shows, videos and movies), which in turn leads to greater utility and thus greater hardware demand."); Robin S. Lee, "Vertical Integration and Exclusivity in Platform and Two-Sided Markets," *American Economic Review*, 103(7), 2013, pp. 2960–3000 at pp. 2961, 2964 ("Modeling both sides of the market captures the *dynamic indirect network effects* exhibited in [the U.S. video game] industry, and allows agents to respond to past and anticipated future actions of others... platform markets are often inherently dynamic environments: goods are durable and are not repurchased, and consumers may delay purchase due to favorable expectations over future product availability, pricing, and quality. A large literature has shown the limitations of applying static methods to dynamic settings.").

deposition that his PCM's lack of incorporation of platform characteristics makes it "incredibly robust," yet it could be robust and valuable only if it captures the industry accurately, which it does not.[265] Dr. Schwartz himself acknowledges that platform characteristics can affect consumer demand, and thus ignoring them can yield unrealistic model predictions.[266] This assumption also means that Dr. Schwartz's PCM is not designed to explain—and therefore *cannot* demonstrate— how the alleged PMFN would affect the pricing decisions and growth strategies of differentiated platforms that vary on multiple dimensions and that compete strategically with each other, as well as with the incumbent platform.

iii. **The PCM assumes that consumers' decisions about where to buy the model's single game depends solely on: (i) the game's relative prices across platforms; and (ii) the entrant's assumed "demand disadvantage."**[267] In reality, people who play video games have different tastes and preferences for games. This includes preferences for certain game characteristics, including graphics, genre, story,

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[265]   Schwartz Deposition, pp. 264:10–265:15 ("Q. Do you believe that your platform competition model can demonstrate how a PMFN will affect differentiated platforms that vary on multiple dimensions? A. I think my model can and does demonstrate that the effect of a platform -- the effect of a PMFN is to raise fees against the situation where there's no PMFN. Q. How does your model model the effect of a PMFN among differentiated platforms that vary on multiple dimensions? A. Because for purposes of the analysis, I don't impose conditions on the 2 platforms other than one is a so-called lower value offering which simply means that it's a lower demand. I don't impose any other conditions. There are no external or exogenous conditions imposed on the platform on platform structure, platform governance, any of those things; no commentary on whether one platform is better than another. So in that sense, the model is I think incredibly robust in terms of its ability to predict the impact of a PMFN generally in the situation that we have here, which fits the facts of this marketplace I think pretty well.").

[266]   Schwartz Deposition, pp. 255:9–256:19 ("Q. Do consumers have different preferences regarding a game's price on a given platform and on competing platforms? Mr. Leray: I object to form. The Witness: If I understand your question correctly, I think as a general matter, consumers are willing to pay a price for a product so long the price reflects the value they derive. There's a certain amount of search that consumers are willing to engage in in order to see what their price options are. Given search costs, that will determine how much search they're willing to do and how much knowledge they have about other prices. But I think if we assume that search costs are relatively low, I think consumers are looking for the best game/platform value proposition that provides them with the best value. Q. The value taking into account the price and also the attributes of the platforms, in their view? A. It includes the price of the game, the features of the game as it relates to what's available on that particular platform, if there's not content parity, and there could be differentiation across platforms, and whatever attributes there are of the platform beyond the minimum necessary in order to make it a viable platform to play the game.").

[267]   This is captured by the simple demand equations in the Boik and Corts model on the two platforms, which only depend on prices of the games and the "demand disadvantage" parameter ("x"), and have identical price sensitivity parameters (b and d) on both platforms. See Boik and Corts (2016), p. 123 ("$\hat{q}_1(p) = a - bp_1 + dp_2$ and $\hat{q}_2(p) = a - x - bp_2 + dp_1$"). Here parameter b captures own-price sensitivity, that is, how much the demand on a platform changes in response to a change in price of the game on the same platform. Parameter d captures the cross-price sensitivity, that is, how much the demand on a platform changes in response to a change in price of the game on the competing platform.

gameplay, and whether a game is single- versus multi-player.[268] They also have different tastes for certain platform features, which may include user-generated game reviews, discovery tools to find new games, tools to communicate with other players, or the accessibility of different controllers or settings.[269] Because consumers differ in terms of these preferences, they will also differ in the value they derive from a certain game, and in the value they derive from games on specific platforms. This variation in consumer preferences will in turn create variation in the prices that consumers would be willing to pay for a given experience. Such differences in consumers' preferences, tastes, and willingness to pay interact with the multiple and differentiated games, publishers, and platforms available in the video game industry. Therefore, the impact of the alleged PMFN would vary by games, publishers, and platforms.

iv. **The PCM assumes that consumers have identical responses to changes in the price of the single game, irrespective of which of the**

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[268]   In his deposition, Dr. Schwartz acknowledged that game attributes can influence consumer purchase decisions. See Schwartz Deposition, pp. 24:2–25:11 ("Q. Does the kind of game a consumer wants influence the consumer's decision to buy or not to buy a video game? A. When you say kind of game, should I interpret that to mean genre or what -- if not, what do you mean by 'kind of game'? Q. Any of the attributes that the game possesses. A. Again, as a conceptual matter, we can think of consumers observing the array of product characteristics in making their purchase decisions and the choices around that set of alternatives and the set of characteristics each present. As a sweeping matter, I don't think we can say that every feature of a video game is necessarily -- or every attribute of a video game is necessarily going to be of equal importance to every consumer, and it's entirely possible that some attributes may not be of any importance to that consumer. Q. Some will be more important to some consumers and other attributes will be more important to other consumers? A. That's certainly a possible outcome. Q. Do you believe it's true? A. Are we talking generically or about video games? Q. About video games. A. It would not surprise me if that's the case.").

[269]   Dr. Schwartz himself recognizes the importance of certain platform features in determining consumers' demand for games on various platforms. See Schwartz Report, ¶¶ 41, 71 ("Valve also offers algorithmic marketing on Steam. Algorithmic marketing offers personalized visibility to users; According to Valve, Steam 'automatically customizes elements of the store for every user[,]' so there is 'no one algorithm.' Steam's 'algorithms' respond to player preferences and interests. Hence, Steam is personalized for users, letting 'player preferences drive the visibility to make recommendations relevant.' For example, Steam Store's New & Trending, Top Sellers, Popular Upcoming, and Specials tabs are all driven by algorithmic visibility... When searching for games on Steam, for example, users can filter games by price, tag, number of players, and supported languages; users can sort those search results based on relevance, release date, price, and user review ... Digital distributors may also tailor their platforms to customers with personalized recommendations based on past purchases or data from other customers."). See also Schwartz Deposition, pp. 25:12–26:17 ("Q. When a consumer is deciding to buy a video game, do the attributes of the platform on which the consumer might buy it factor into the consumer's decision? A. It certainly could be a factor. Q. Do you believe it is a factor? A. I would give an answer similar to the one that I gave before. It may be an important factor for some consumers. It may not be an important factor for others. But it certainly could be a factor that would be relevant to some set of consumers. Q. And those attributes would be 2 both price and nonprice attributes? A. Talking about the medium on which the game is played? Q. The platform. A. Again, as an economic matter, I can't rule out the possibility that both price and nonprice factors will be relevant to consumers. The relative weight that a given consumer puts on price versus nonprice factors will likely be different across consumers and it may be that, for some consumers, price factors may not matter at all and for others nonprice factors may not matter at all or some nonprice factors may not matter at all.").

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two platforms the game is sold on. That is, Boik and Corts assume fixed and identical price sensitivity for consumers across the two platforms; Dr. Schwartz adopts these assumptions in his PCM.[270] However, these assumptions contradict industry facts where different consumers with varied tastes and preferences not only adjust their consumption of games differently in response to a change in the price, but they may also decide to switch to alternative games and platforms.[271] Therefore, the price sensitivities of each consumer will be different across different games and platforms, depending on the consumers'

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[270]   Dr. Schwartz assumes that the two price sensitivities—that is, the extent to which demand on a platform changes in response to an increase in prices on that platform (i.e., own-price sensitivity of demand captured by parameter "b" in Dr. Schwartz's PCM), and the extent to which it changes in response to an increase in prices on the competing platform (i.e., cross-price sensitivity of demand captured by parameter "d" in Dr. Schwartz's PCM)—are identical and fixed across the two platforms. In other words, parameters b and d in Dr. Schwartz's adaptation of the Boik and Corts model are assumed to have the same value in the demand equations for the game on each of the two platforms. See Schwartz Report, ¶ 252; Boik and Corts (2016), p. 123.

[271]   See, e.g., Adam Starkey, "Steam Players Hit Record High as PC Gaming Starts to Leave Consoles Behind," *Metro*, March 4, 2024, available at https://metro.co.uk/2024/03/04/steam-players-hit-record-high-pc-gaming-starts-leave-consoles-behind-20392984, accessed on May 6, 2024 ("Following the success of Palworld and Helldivers 2, Steam has managed to hit a new all-time high in concurrent players. While there's more competition than ever in regards to rival PC storefronts, Valve's Steam service is still managing to break player records. Between Palworld and Helldivers 2, this year's biggest hits so far have both been released day one on PC – which puts into perspective why Sony is prioritising the platform more than ever for its exclusive games. ... The popularity of Steam will likely continue to grow over this year considering the 2024 slate for other platforms looks pretty bleak, with Sony not lining up any major exclusives and Nintendo's Switch 2 not expected until 2025. The fact that Steam, and PC gaming in general, has managed to keep its expanded audience from the pandemic also stands in direct contrast to the console market."); Jay Peters, "The Steam Deck is Changing How I Buy Games," *The Verge*, July 9, 2022, available at https://www.theverge.com/2022/7/9/23200791/steam-deck-changing-buy-games-nintendo-switch, accessed on May 6, 2024 ("Buying multiplatform games used to be a simple decision for me: I'd almost always get them on the Nintendo Switch because of how easy it is to play games both on a TV or in portable mode. The Steam Deck has thrown a wrench in that decision-making process. The handheld gaming PC might be heavier, have worse battery life, and doesn't come with an easy Switch-like dock to throw my games onto a bigger screen, but because I feel like I can bank on Steam games being available much longer into the future, I'm having to make tough choices about whether I buy games on Valve's storefront instead of Nintendo's. ... Right now, I'm still picking the Switch for a lot of games. (And, of course, there are the big games like *Zelda* and *Metroid* that are only available on the Switch.) But what used to be a no-brainer is now something that I have to think hard about, and as Valve keeps improving the Steam Deck, choices in the future might be even harder."); Kirk McKeand, "Surviving in the Storm Circle: Why Ali-A Flipped from COD to Fortnite," *VG247*, April 9, 2018, available at https://www.vg247.com/why-ali-a-left-cod-for-fortnite, accessed on May 6, 2024 ("Recently, Aiken switched all of his attention to Fortnite - Call of Duty has taken a backseat. It was clear after Infinite Warfare's launch in 2016 that interest in Call of Duty was on a downward trend, which Aiken saw reflected in his own numbers, so he experimented with other shooters to figure out where audience tastes were shifting, dipping his toes into Rainbow Six: Siege and trying his luck with older Call of Duty games. 'Then I tried this Fortnite game,' Aiken remembers. 'It didn't do amazing at first, but you are never going to jump straight into a game and it do amazing straight away. Your audience need to decide if they like the game - it's an adjustment process. Some of the videos did okay, and I started to do one every week or so, then they just started doing really well. They would get more views in the first few hours than a COD video would do in a day.' ... Aiken isn't into video game monogamy, then. It makes sense - you have to move with the times in this industry. You only have to look at games such as LawBreakers to see what happens when people misjudge current trends and audience tastes. 'When I started to transition over to Fortnite, to me it was just a reflection of how my gaming time was changing,' Aiken explains. 'I still play COD, I still talk about Black Ops 4, and I still have Call of Duty videos planned. A lot of people who did follow me for COD had stopped watching my videos, maybe because they stopped playing COD, they came back with Fortnite. Although I made a transition to Fortnite, so did my audience.'").

preferences for the characteristics of the game or the features of the platforms.

179. **Third,** Dr. Schwartz's PCM cannot capture the fact that Steam faces not one but multiple competitor platforms. As I discussed in Section 5.1, for his second approach to his empirical analysis of the PCM, Dr. Schwartz makes a set of unrealistic and unfounded assumptions. One of these is the assumption that, **if the single game offered by the single publisher in his PCM were removed from Steam, then EGS would become the *only* platform in the video game industry to sell this game.**[272] Consequently, EGS would be able to charge an inflated revenue share. Dr. Schwartz then assumes that Steam would not set its revenue share to maximize its profit but would instead set it in a way so that the publishers are indifferent between staying on Steam or leaving the platform.[273] These assumptions—and negative economic profits predicted for the publisher by Dr. Schwartz's PCM under his second approach—have no basis in the real world of the video game industry. Contrary to his assumption, in the real world there are also *multiple publishers*;[274] as such, a single publisher delisting a single title from Steam would not stop Steam and EGS from competing with each other. Further, in the real world, there are multiple publishers with different incentives and preferences for the characteristics of various platforms; as such, it would not be possible for Steam to set a single revenue share that can make all the publishers indifferent between staying on Steam versus exiting. Similarly, there are also *multiple platforms,* and therefore, even if Steam ceased to exist, EGS would still face competition from other platforms.[275] The negative profit of the

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[272]   Schwartz Report, ¶¶ A2, A18–A31 ("with negative economic profits, sellers would stop selling on Steam and instead pursue their next best alternative. This results in what is known as a 'corner solution' ... What their next best option is depends on the demand parameters of the model. One option the seller has is to exit the market entirely and pursue their next best option, earning zero economic profits (the definition of zero economic profits is the profits at the firm's next best option). The second option is to avoid the PMFN by selling only to EGS. This may seem like an attractive option; however, it would mean the seller sells to the other platform as a (now) monopolist.").

[273]   Schwartz Report, ¶¶ A18–A19.

[274]   Many of these publishers achieve success on non-EGS platforms. See SteamDB, "Popular Game Publishers on Steam," available at https://steamdb.info/publishers, accessed on May 6, 2024; Itch.io, "Top Games," available at https://itch.io/games, accessed on May 6, 2024. For instance, the top 20 highest-selling games on GOG come from nine different publishers (Ubisoft, CD PROJEKT RED, Electronic Arts, Hasbro, Blizzard Entertainment, Eidos Interactive, Beamdog, Larian Studios, and Activision). See GOG, "Sort by: Bestselling (All Time)," available at https://www.gog.com/en/games?order=desc:bestselling, accessed on May 10, 2024.

[275]   For instance, one such competitor platform is Ubisoft's Uplay store. Ubisoft released *Assassin's Creed: Valhalla* on Steam in 2020 after only using its own Uplay store and partnering with EGS for new releases for over a year. See James Batchelor, "Ubisoft Returns to Steam with Assassin's Creed: Valhalla," *GamesIndustry*, November 22, 2022, available at https://www.gamesindustry.biz/ubisoft-returns-to-steam-with-assassins-creed-valhalla, accessed on May 6, 2024 ("Assassin's Creed: Valhalla will be the first Ubisoft title to release on Steam since Starlink: Battle for Atlas in April 2019. The publisher has still been releasing updates and DLC for titles such as For Honor and Rocksmith. For new releases, the company focused on its own UPlay store as well as landing partnerships with

publisher on Steam that Dr. Schwartz presents in Table 3 of his report corresponds to the second approach of his empirical analysis.[276] This clearly illustrates how his additional unrealistic assumptions result in unrealistic predictions of his PCM.

180. **Fourth, Dr. Schwartz has not shown that his solution to his PCM under his second approach is a valid solution of the model.** Dr. Schwartz changed the Boik and Corts model for his second approach by introducing a set of additional and unrealistic assumptions, as I discussed above. These additional assumptions limit the economic actors' ability in his PCM to make their optimal choices.[277] In particular, Dr. Schwartz is changing the set of potential options Steam has while seemingly leaving EGS's pricing strategy unchanged.[278] Dr. Schwartz has not proved that such changes in his assumptions are consistent with the optimal rules of behavior and choices of the economic agents in his PCM that imply optimal economic outcomes for them (e.g., obtaining maximum profits for the publisher and the platforms such that they cannot take any alternative action to increase their profits).[279] Specifically, he has not shown that EGS will continue to follow the same pricing

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Steam's then-new rival Epic Games Store, starting with Tom Clancy's The Division 2."). Steam and EGS both also compete with other platforms such as GOG Galaxy, Ubisoft Connect, and Itch.io. See Robin Valentine, "PC Gaming's Many Launchers, Reviewed for 2024: Steam Still Puts the Rest to Shame," *PC Gamer*, January 30, 2024, available at https://www.pcgamer.com/pc-gamings-many-launchers-reviewed-for-2024-steam-still-puts-the-rest-to-shame, accessed on May 6, 2024 ("Whether you're a Steam devotee or have a taskbar overflowing with different logos, launchers are a staple (and unavoidable) part of modern PC gaming.").

[276] In particular, Dr. Schwartz's results in Table 3 of his report correspond to his empirical analysis for the second approach. See Schwartz Report, ¶ A34.

[277] For instance, he assumes that Steam is no longer setting its revenue share to maximize its profits. See Schwartz Report, ¶ A2 ("Rather than maximize their profits by setting marginal revenue equal to marginal costs, Steam would need to set its price at the highest level that still keeps the seller in the market... Steam would lower their fees until sellers are just indifferent between selling on Steam and their next best option.").

[278] In particular, Dr. Schwartz assumes that EGS is still setting its revenue share to maximize its profit, even though Steam is assumed to not maximize its profit anymore. See Schwartz Report, ¶ A30 ("For the corner solution... the program searches over Steam fee values f_1^2 and computes the competitor's fee f_2^2 using EGS's best response function (which determines their optimal fee given Steam's fee). ESG's [*sic*] best response function can be found by maximizing their profit function taking Steam's fee as given (as it will be given in the search algorithm).").

[279] In particular, Dr. Schwartz has not proven that, under this new set of assumptions, the actions of the economic actors in his PCM ensure that they are taking actions that are mutual best responses. This means that he has not shown that, conditional on knowing what the other actors choose, each actor would not want to change their action to improve their outcomes. Economists refer to this notion of optimal rules of behavior and optimal choices of the economic agents as a "Nash Equilibrium," where each economic agent's action is a "best response" to the actions of all other economic agents. See, e.g., Martin J. Osborne and Ariel Rubinstein, *Models in Microeconomic Theory*, (Cambridge: Open Book Publishers, 2020), pp. 217, 218, 241 ("In a strategic game, each individual chooses an action from a given set and is affected not only by this action but also by the other individuals' actions. We study the notion of Nash equilibrium, according to which a profile of actions is stable if no individual wants to deviate from his action given the other individuals' actions ... A Nash equilibrium is an action profile with the property that no deviation by any player leads to an action profile that the player prefers. That is, every player's action in a Nash equilibrium is best for him given the other players' actions ... We can express the condition for a Nash equilibrium differently using the notion of a best response ... A Nash equilibrium is a profile of modes of behavior that is known to all players and is stable against the possibility that one of them will realize that his action is not optimal for him given the other players' behavior.").

strategy as in the Boik and Corts model when he limits Steam's pricing options. Boik and Corts make very specific assumptions in order to guarantee that no actor would want to change their behavior given what other actors choose to do.[280] Changing even one of these assumptions requires re-proving that, in response to the change in one actor's decision, other actors would not change their decisions too.

181.   **Fifth, Boik and Corts assume—and Dr. Schwartz adopts this assumption—that platforms charge piece-rate revenue shares (e.g., $20 per game sold) rather than charging revenue shares that are a percentage of the game price.[281] In reality, as Dr. Schwartz himself acknowledges, most platforms, including Steam, charge publishers a percentage revenue share.[282]** Academic literature demonstrates that the use of piece-rate fees versus percentage fees can affect economic outcomes, since each drives economic incentives differently.[283] As a result, Dr. Schwartz's PCM does not accurately capture the incentives of stakeholders in the video game industry that set or pay a percentage revenue share.

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[280]   These assumptions by Boik and Corts are necessary to guarantee that economic actors in their model make optimal choices and none of them has the incentive to choose something else. Specifically, Boik and Corts explain that they begin their analysis "by deriving best-response fee-setting functions under each of the PMFN regimes" and that these best response functions for the fees result from "the first-order conditions (FOCs) for platforms' profit maximization." Then, they use these best-response functions to "derive closed-form expressions for the optimal pricing rule, implied demand function, and equilibrium fees under each regime." See Boik and Corts (2016), pp. 113, 133.

[281]   As I explained in Section 2.2, throughout my report, I refer to "commission rate" or "fees" that are charged to publishers by platforms as a "revenue share."

[282]   Schwartz Report, ¶ 381 ("Commissions such as the one imposed by Steam are akin to an ad valorem tax. This tax levies a fee as a percentage of the price of a product when it is sold"). See also Schwartz Deposition, p. 231:19–21 ("I'm doing a couple of things. The first is describing the commission as an ad valorem fee."). An "ad valorem" fee is a fee applied on a percentage basis rather than on a per-unit basis. See Jeffrey M. Perloff, *Microeconomics*, Seventh Edition, (Boston: Pearson Education, 2015), p. 58 ("The most common sales tax is called an *ad valorem* tax by economists and *the* sales tax by real people. For every dollar the consumer spends, the government keeps a fraction, α, which is the ad valorem tax rate.").

[283]   See, e.g., Harvey E. Lapan and David A. Hennessy, "Unit Versus Ad Valorem Taxes in Multiproduct Cournot Oligopoly," *Journal of Public Economic Theory*, 13(1), 2011, pp. 125–138 at p. 125 ("The choice between per unit taxation and *ad valorem* taxation in imperfectly competitive markets has received continuing attention since Suits and Musgrave (1953)."); Ben Lockwood and Kar-Yiu Wong, "Specific and Ad Valorem Tariffs are not Equivalent in Trade Wars," *Journal of International Economics*, 52(1), 2000, pp. 183–195 at pp. 183–184 ("The relationship between ad valorem and specific taxes have long been an issue in the literature of international trade and public finance... The equivalence between ad valorem and specific taxes breaks down, however, when either the domestic or foreign industries are not competitive ... In all these cases, the monopolistic firm is not a price taker, and when a government switches from a specific tax to an ad valorem tax, the monopolistic firm has an incentive to change its production and the market price in such a way to lower its tax liability. Thus the two types of taxes have different implications on resource allocation and welfare."); Cuihong Fan, Byoung Heon Jun, and Elmar G. Wolfstetter, "Per Unit vs. Ad Valorem Royalty Licensing," *Economics Letters*, 170, 2018, pp. 71–75 at p. 72 ("We identify testable conditions that explain when either per unit or ad valorem royalties should be observed: Specifically, per unit licensing is more profitable if the licensor is more efficient in using the innovation, whereas ad valorem licensing is more profitable if the licensee is more efficient."). Further, Boik and Corts acknowledge that a proportional versus fixed per-unit fee will manifest differently from the publisher's perspective. See Boik and Corts (2016), p. 110, footnote 3 ("In general, in these kinds of models, a proportional commission has the effect of raising the seller's perceived marginal cost ... whereas in our model the fixed per-unit fee directly raises that marginal cost.").

Consequently, his model is ill-suited to make predictions about the economic outcomes of these stakeholders both in the as-is and the but-for worlds.

182.   In sum, Dr. Schwartz's PCM makes several assumptions that are at direct odds with the industry it is being applied to. The contrast between Dr. Schwartz's model and the real world helps explain why Dr. Schwartz's model generates unreliable predictions that do not make economic sense and are not reflective of important facts of the video game industry. These assumptions therefore render Dr. Schwartz's model ill-suited for reliably predicting economic outcomes in the but-for world absent the alleged conduct. Consequently, Dr. Schwartz's PCM cannot be used for making predictions about the but-for world and establishing how the alleged PMFN may have harmed proposed class members.

5.4.   Dr. Schwartz's PCM assumes a large, fixed, and persistent "demand disadvantage" and thus his PCM assumes, rather than demonstrates, his conclusion that the alleged PMFN deters entry

183.   As described in Section 5.3, the persistent "demand disadvantage" parameter is one (among many) ways in which Dr. Schwartz's PCM deviates from the video game industry it purports to model. Dr. Schwartz's choices regarding this parameter are *critical assumptions*—meaning that different assumptions would lead his model to different conclusions.[284] Dr. Schwartz asserts in his report that the alleged PMFN decreases entry of competitor platforms.[285] Despite this assertion, both his PCM and the original Boik and Corts model only predict this result for specific values of his model parameters.[286] The fact that his model's predictions are sensitive to particular parameter choices is important; as I demonstrate in this section, Dr. Schwartz's choice regarding the "demand disadvantage" parameter actually makes his PCM *less* capable of describing the real

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[284]   The importance and implications of such critical assumptions are well understood in the economics literature. See, e.g., Dani Rodrik, *Economic Rules: The Rights and Wrongs of the Dismal Science*, (New York: W. W. Norton & Company, 2015), pp. 21–22 ("What exactly is a critical assumption? We can say an assumption is critical if its modification in an arguably more realistic direction would produce a substantive difference in the conclusion produced by the model ... The applicability of a model depends on how closely critical assumptions approximate the real world. And what makes an assumption critical depends in part on what the model is used for.").

[285]   Schwartz Report, ¶¶ 262–271 ("As a result of inflated platform fees and potentially consumer prices (depending on pass-through), PMFNs in general deter entry of platforms with a 'sufficiently large difference in position.'").

[286]   Later in this section, I further explain the "demand disadvantage" parameter and how it affects conclusions about the impact of a PMFN on platform entry. See also Boik and Corts (2016), p. 123; Schwartz Report, ¶ 253.

world. Choosing more realistic parameter values would only have led Dr. Schwartz's PCM to the conclusion that the alleged PMFN does not deter entry.

184.   The "demand disadvantage" parameter is meant to measure the extent to which users prefer Steam to EGS.[287] Dr. Schwartz uses an estimate of ████ for the "demand disadvantage" parameter, which means that Steam's market share is roughly ███████ higher than the market share of the rest of the competitor platforms.[288] Further, he assumes that this "demand disadvantage" of the entrant platform would remain persistent after entry.

185.   To see how different values of the "demand disadvantage" parameter can generate different predictions about whether the alleged PMFN would encourage or deter entry, Boik and Corts use a figure (reproduced in Panel 1 of Exhibit 7) to illustrate the relationship between the "demand disadvantage" parameter and the impact of a PMFN on entry.[289] Dr. Schwartz adapts this figure in Figure 4 of his report (reproduced in Panel 2 of Exhibit 7).[290]

186.   Focusing on Panel 1 in Exhibit 7, the horizontal axis on the graph represents the size of the "demand disadvantage" ("x"), while the vertical axis represents different possible values of the fixed cost of entry. The two lines in the figure represent the profit of the entrant platform in the world with a PMFN (i.e., the steeper line) and that in the world without a PMFN (i.e., the flatter line), for different values of the "demand disadvantage."[291] These two lines create four regions that capture four potential

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[287]   That is, how much lower demand does EGS face as compared to Steam for identical prices of the game on the two platforms. See Boik and Corts (2016), p. 123; Schwartz Report, ¶ 253.

[288]   In particular, Dr. Schwartz uses his market share estimate of ████ percent (███████ units) for Steam and he attributes the remaining market share of ███ percent (███████ units) to EGS, by assuming that this is Steam's only competitor in the entire video game industry. This results in his "demand disadvantage" of ███ percent (███████ units) for EGS relative to Steam, which he calculates by taking the difference between his assumed market shares of the game sold on Steam and EGS, respectively. See Schwartz Report, ¶¶ 254, 273, Table A.4.

[289]   Boik and Corts (2016), p. 125, Figure 2.

[290]   Schwartz Report, p. 156, Figure 4.

[291]   The steeper of the two lines represents the profits for the entrant platform in a world with a PMFN while the other line represents profits of the entrant in the world without a PMFN. That is, the line labeled π_2^{2*} represents profits for the entrant platform when the incumbent platform has a PMFN, and π_2^{0*} represents profits for the entrant when the incumbent does not have a PMFN. See Boik and Corts (2016), pp. 124–125.

outcomes regarding entry.[292] Two of these outcomes are worth noting.[293] The top-left region, labeled **"enter only if PMFN,"** captures **entrants with low "demand disadvantage,"** that will find it profitable to **enter only in a world *with* a PMFN**.[294] Alternatively, the bottom-right region, labeled **"enter only if no PMFN,"** corresponds to **entrants with high "demand disadvantage,"** that will find it profitable to **enter only in a world *without* a PMFN**.[295]

Exhibit 7
Dr. Schwartz's assumption about the "demand disadvantage" (parameter "x") leads him to assume, rather than demonstrate, the impact of a PMFN on platform entry
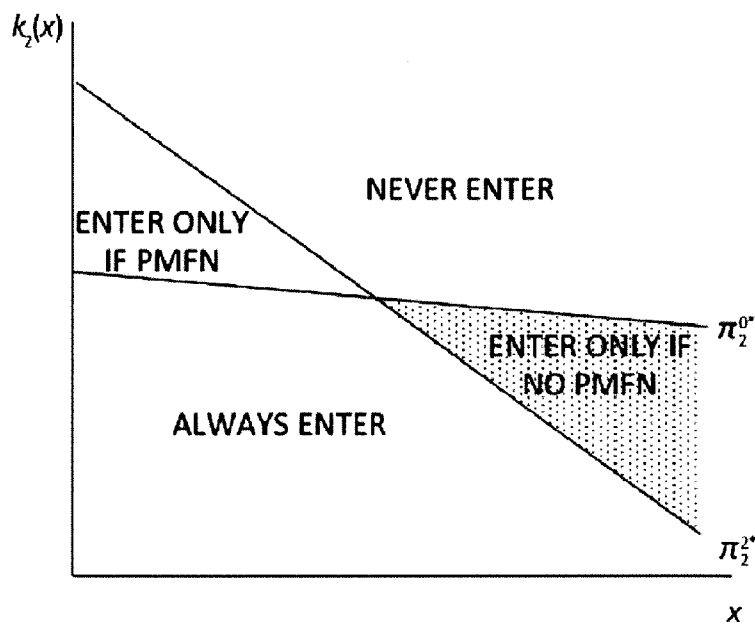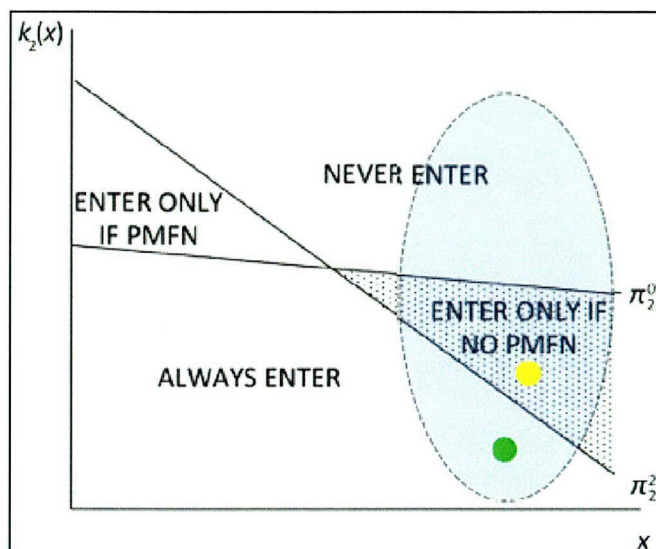

Panel 1: Figure 2 from Boik and Corts (2016)

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[292]   These four outcomes are labeled as "always enter," "never enter," "enter only if PMFN," and "enter only if no PMFN." The decision is captured by the condition $\pi_2^{j^*}(x) - k_2(x) \geq 0$. See Boik and Corts (2016), p. 124; Schwartz Report, ¶ 265.

[293]   The remaining two regions capture the cases in which the potential competitor always enters or never enters. In these two scenarios, the variable profits either always cover the fixed cost of entry (always enter) or never cover these fixed costs (never enter), regardless of whether there is a PMFN. See Boik and Corts (2016), p. 125.

[294]   Boik and Corts (2016), pp. 125–126 ("[T]he incumbent's adoption of a PMFN policy encourages entry (raises postentry profits relative to those that arise absent a PMFN policy) if the entrant is not too differentiated[.]").

[295]   Boik and Corts (2016), pp. 125–126 ("[I]f the [PMFN] policy discourages entry (lowers postentry profits relative to those that arise absent a PMFN policy) it is only for entrants with a sufficiently large difference in position.").

Panel 2: Dr. Schwartz's adaptation of Figure 2 from Boik and Corts (2016)

Source: Boik and Corts (2016), Figure 2; Schwartz Report, Figure 4
Note: Boik and Corts use the figure in Panel 1 to illustrate how the impact of a PMFN varies with assumptions about the size of the "demand disadvantage" (parameter "x" on the x-axis). According to this figure, a PMFN discourages entry for high values of "demand disadvantage" and encourages entry for low values of "demand disadvantage." Dr. Schwartz accepts these conclusions and adopts the figure by Boik and Corts in his report (Panel 2). He assumes that the competing platforms fall in blue shaded oval in the right side of the graph with high "demand disadvantage." He further adds dots in the blue shaded oval of his adaptation of the Boik and Corts figure to depict specific potential positions of the entrant platforms. Dr. Schwartz argues that a platform on the green dot "always enters the market" regardless of the incumbent's PMFN policy, while the platforms on the yellow dot "would enter absent the PMFN but [do] not enter in the presence of the PMFN" (See Schwartz Report, ¶¶ 266–267). However, in reality, many potential entrants would have low "demand disadvantage" and would fall on the left side of the figure. Hence, Dr. Schwartz's assumptions regarding the "demand disadvantage" parameter result in his model assuming rather than demonstrating that the alleged PMFN deterred entry.

187.   Potential (and observed) entrants in the real world—each with their own "demand disadvantage" relative to Steam—could fall anywhere across the four regions in the Boik and Corts figure. This figure illustrates that the **potential entrant with low "demand disadvantage" would land on the left side of the figure; for such entrants, the model would predict that a PMFN encourages their entry** by raising profits[296]—a fact that Dr. Schwartz acknowledges.[297] The economics literature recognizes that PMFNs can provide

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[296]   For instance, some potential competitors may have a low "demand disadvantage." These potential entrants would likely fall on the left side of the Boik and Corts figure—"enter only if PMFN"—or in the bottom region—"always enter." Boik and Corts show that for such platforms, "PMFN policies raise equilibrium post-entry profits" and that these "profit-increasing effects of PMFN agreements encourage the entry" of competitor platforms. See Boik and Corts (2016), pp. 124–125 ("For small demand disadvantages, PMFN policies raise equilibrium postentry profits.... At left is a region in which the profit-increasing effects of PMFN agreements encourage the entry of the relatively similar entrant. To be clear, here the entrant would not enter absent a PMFN policy but does enter when the incumbent adopts a PMFN policy.").

[297]   In particular, he concludes that "[i]f there were 'similar' platforms on the left-hand side of the graph, the PMFN would ... encourage them to enter," but he fails to recognize, as Boik and Corts (2016) show, and as I explained

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additional procompetitive effects beyond encouraging entry. As an example, the literature recognizes that there are situations where one platform can "free ride" on the functionality of another. This can happen when users take advantage of one platform's search and discoverability features and then make purchases on another platform.[298] In cases where this kind of free-riding is common, there is less incentive to invest in the quality of the platform.[299] Dr. Schwartz's PCM does not consider this dimension of platform quality, or the decision of platforms owners to invest, and as a result does not capture the full range of competitive effects driven by the alleged PMFN.[300]

188.   Yet, rather than allow for entrants to fall into different quadrants, Dr. Schwartz assumes that potential entrants face a very high "demand disadvantage" (i.e., high parameter "x"). Dr. Schwartz asserts, without proof, that "competing platforms fall on the right side of the graph in the blue shaded oval" that corresponds to a high "demand disadvantage."[301]

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in this section, that this is not only *because* the PMFN increases platform fees" as Dr. Schwartz claims, but also because the entrant platform has a low "demand disadvantage." See Schwartz Report, ¶ 268.

[298]   N. Gregory Mankiw, *Principles of Economics*, Eighth Edition, (Boston: Cengage Learning, 2018), p. 214 ("A free rider is a person who receives the benefit of a good but does not pay for it. Because people would have an incentive to be free riders … the market would fail to provide the efficient outcome."); Hal R. Varian, *Microeconomic Analysis*, Third Edition, (New York: W. W. Norton & Company, 1992), p. 417 ("If consumer 1 buys the good, he gets $100 worth of benefits, but has to pay $150 for these benefits. If consumer 1 buys, but consumer 2 refrains from buying, consumer 2 gets $100 worth of benefits for free. In this case we say that consumer 2 is free riding on consumer 1 … The dominant strategy equilibrium in this game is (don't buy, don't buy). Neither consumer wants to buy the good because each prefers to free-ride on the other consumer. But the net result is that the good isn't provided at all, even though it would be efficient to do so. This shows that we cannot expect that purely independent decisions will necessarily result in an efficient amount of the public good being provided. In general it will be necessary to use more complicated mechanisms.").

[299]   See, e.g., Margherita Colangelo, "Competition Law and Most Favoured Nation Clauses in Online Markets," in *New Developments in Competition Law and Economics*, eds. Klaus Mathis and Avishalom Tor, (New York: Springer, 2019) pp. 295–317 at p. 299 ("[W]ithout protective measures such as MFN clauses, suppliers may use online platforms to attract customers yet subsequently switch demand to their direct or other sales channels by reducing prices. Thus, customers might use the platform in order to get information about the product or services and then subsequently finalize the transaction on the supplier's website or through other channels at a lower price."); Justin P. Johnson, "The Agency Model and MFN Clauses," *The Review of Economic Studies*, 84(3), 2017, pp. 1151–1185 at p. 1173 ("Although the analysis above indicates how MFNs may raise prices and harm consumers, it is not hard to imagine how MFNs might also be pro-competitive. For example, MFNs might encourage investments. This force seems particularly relevant for markets where the retail landscape is changing rapidly. In particular, many new online retailers have appeared in recent years, and some of them have chosen to use price-parity restrictions. Some of these retailers have faced substantial costs of developing their online platforms and it is possible that price-parity restrictions have encouraged their entry and benefitted consumers. For instance, Amazon and Apple played important roles in building the e-book market, investing not only in online stores but in hardware devices that encouraged e-book adoption. It is unclear whether Apple would have made these investments without the guarantees provided by MFNs, which possibly would have left Amazon unchecked and consumers and publishers with fewer options. In other words, it is possible that the entry-inducing effects of MFNs played a role in the e-book market.").

[300]   Similarly, the model from Boik and Corts (2016) does not allow for this type of behavior since it is focused narrowly on entry and pricing decisions.

[301]   Schwartz Report, ¶ 266.

He further argues that certain potential competitors, such as those marked on the same figure by the yellow dot, would enter only if a PMFN were not in place.[302]

189.   While Dr. Schwartz justifies his choice of the "demand disadvantage" using data on sales from EGS and Steam, he fails to consider how this choice affects the ability of his model to generate predictions that are consistent with the real world. He also fails to consider whether the assumptions made about this parameter in the original Boik and Corts model are suitable to the realities of the video game industry and video game distribution platforms.

190.   As discussed in Section 5.3, the PCM assumes a large, fixed, and persistent "demand disadvantage" of the entrant relative to the incumbent platform (i.e., "x" parameter).[303] Since the quantity of games demanded from different potential entrants can be different, the entrants may experience a higher or lower "demand disadvantage," which in the PCM may either encourage or discourage entry.[304] There are two primary reasons why the "demand disadvantage" for EGS may not be as large, fixed, and persistent as Dr. Schwartz assumes in his PCM.

191.   **First,** as discussed in Section 5.3, **the Boik and Corts model (and its adaptation by Dr. Schwartz) ignores network effects, which are a critical feature of the video game industry.** In the presence of network effects, the "demand disadvantage" would likely not be fixed and persistent, as Dr. Schwartz assumes.[305] Rather, it will depend on factors such as the number and types of consumers, publishers, and games on the platform, which change over time and are different across platforms. As such, platforms derive value from larger customer, publisher, and game bases, as acknowledged by Dr. Schwartz.[306] This

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[302]   Schwartz Report, ¶ 267.

[303]   Schwartz Report, ¶¶ 254, 273, Table A.4.

[304]   Boik and Corts conclude—and Dr. Schwartz adopts their conclusion—that depending on how large the "demand disadvantage" is, a PMFN may either encourage or discourage competitor platforms' entry. See Boik and Corts (2016), p. 125 ("As a result, whether the incumbent's PMFN policy encourages or discourages entry depends on the exogenous demand disadvantage x of the entrant and its associated fixed cost $k_2(x)$."); Schwartz Report, ¶¶ 265–268 ("[T]he effect of the PMFN on overall entry depends on the entrant platform's type (where they fall on the graph).").

[305]   Network effects can lead to a platform's growth over time, thus reducing its "demand disadvantage." See Bruno Jullien, Alessandro Pavan, and Marc Rysman, "Two-Sided Markets, Pricing, and Network Effects," Handbook of Industrial Organization, 4(1), 2021, pp. 485–592 at p. 488 ("As a product with network effects diffuses into the market, it becomes more valuable and drives further adoption. Indirect network effects thus lead to a feedback loop as more participants on each side of the platform find it more valuable to adopt and use the platform when they expect the other side to attract more users.").

[306]   Schwartz Report, ¶ 30.

leads to platforms adopting growth strategies to expand these customer bases—and thus demand for games—on their platforms over time.[307] Therefore, one would expect that, **in the presence of network effects, an entrant platform could increase its market share and simultaneously lower its "demand disadvantage" after its entry in the video game industry.**[308] This could place the potential entrant in the left side of the figure in Panel 2 of Exhibit 7, in the "enter only if PMFN" region, where the PCM predicts that a PMFN encourages entry.[309]

192.   Second, **a platform may strategically choose to enter a niche segment—Dr. Schwartz's PCM does not accommodate such an entry strategy.** In that case, a platform's entry decision would be based on the prospect of attracting only a subset of customers in a broader market.[310] Pursuing a niche strategy in a setting with differentiated products can reduce price competition for an entrant and support its profitability through capturing a large share of the targeted consumers' demand post-entry.[311] Consequently, **an entrant platform targeting a niche segment could have a low "demand disadvantage" post-**

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[307]   As explained in Section 5.3, such growth strategies include platforms specializing in particular kinds of games, paying publishers to sell their games only on a given platform, offering free games, or offering specific features. See, e.g., Marc Rysman, "The Economics of Two-Sided Markets," *Journal of Economic Perspectives*, 23(3), 2009, pp. 125–143 at p. 131 ("Two-sided markets raise questions for dynamic pricing as well. Penetration pricing, such as when an intermediary lowers price early in the product life cycle and raises it after having established a base, is a natural outcome of two-sided markets.").

[308]   For instance, EGS has employed a variety of growth strategies to achieve high growth rates compared to the rest of the industry. See Epic Games, "Epic Games Store 2023 Year in Review," February 16, 2024, available at https://store.epicgames.com/en-US/news/epic-games-store-2023-year-in-review, accessed on May 14, 2024 ("There are now over 270 million Epic Games Store PC users, an increase of 40M from 2022."); Mark Sammut and Samyarup Chowdhury, "Epic Games Store: A Comprehensive List of Every Free Game It's Had to Date," *GameRant*, May 16, 2024, available at https://gamerant.com/epic-games-store-free-games-list/, accessed on May 16, 2024 ("Since launching in 2018, the Epic Games Store has consistently released titles for free.").

[309]   Schwartz Report, ¶ 268; Boik and Corts (2016), p. 125.

[310]   In the parlance of the Boik and Corts model, entering a niche segment of the market (e.g., by providing specialized services tailored to a specific customer base in a broader market) could translate into the entering platform having a low "demand disadvantage" (i.e., low value of "x"). These potential entrants would likely fall on the left side of the Boik and Corts figure (Panel 1 of Exhibit 7)—in the "enter only if PMFN" region—or in the bottom region—"always enter." Boik and Corts show that for such platforms, "PMFN policies raise equilibrium postentry profits" and that these "profit-increasing effects of PMFN agreements encourage the entry" of competitor platforms. See Boik and Corts (2016), pp. 124–125 ("[H]ere the entrant would not enter absent a PMFN policy but does enter when the incumbent adopts a PMFN policy.").

[311]   Jean Tirole, *The Theory of Industrial Organization*, (Cambridge: MIT Press, 1988), pp. 278 ("Two firms producing perfect substitutes face unbridled price competition (at least in a static framework). In contrast, product differentiation establishes clienteles ('market niches,' in the business terminology) and allows firms to enjoy some market power over these clienteles."), 295 ("The idea that product differentiation softens price competition fits well with the observation that firms often search for market niches when positioning their products."); David A. Besanko and Ronald R. Braeutigam, *Microeconomics*, Fourth Edition, (Hoboken: John Wiley & Sons, 2011), p. 594 ("Decisions about how to position a product in the marketplace ('Do we aim at a mass market or at a high-end niche?') … can have an important impact on how competition in the marketplace unfolds later on. For example, a firm's decision to position its product in a high-end niche might have strategic value by reducing the fierceness of price competition with other competitors. This is so even though the direct effect of a niche strategy would be to limit the size of the product's potential market.").

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entry—and could even have a *negative* "demand disadvantage" if its market share is larger than the incumbent's—among the subset of consumers it targets.[312]

193.   Had Dr. Schwartz accounted for network effects or allowed targeted entry strategies, his model would have assumed a lower "demand disadvantage" between Steam and the potential entrants (such as EGS) and thus could have predicted that a PMFN would *encourage* entry. Similarly, if Dr. Schwartz accounted for the fact that Steam has multiple competitors (rather than just, as he assumes, a single competitor in EGS) his PCM would have estimated the "demand disadvantage" parameter differently. While assessing the proper definition of the market is beyond the scope of my report, I note that Dr. Schwartz recognized in his deposition that "as a matter of both economics and math" the second platform in his PCM should reflect an *aggregation* of all non-Steam platforms.[313] Despite acknowledging this, Dr. Schwartz assumes that this second platform in his PCM is EGS and

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[312]   Academic literature has discussed niche entry strategies in the context of two-sided platforms. See, e.g., Carmelo Cennamo and Juan Santalo, "Platform Competition: Strategic Trade-Offs in Platform Markets," *Strategic Management Journal*, 34(11), 2013, pp. 1331–1350 at p. 1336 ("Platforms may choose to compete head-to-head with rivals in a densely populated market niche … or choose, instead, to target segments that, while oriented to a smaller number of consumers, have less intense competition … Because platforms vary in the degree to which they embrace various market niches, the degree of difference required to create a distinctive position for any given platform will depend, in part, on the market niches its competitors pursue. For instance, in the current generation of video game consoles, the Sony PlayStation and Microsoft Xbox platforms focus largely on the 'action,' 'fight,' and 'sport' segments of the market, while the Nintendo Wii console mostly targets 'general games' and 'platform character' to aim at casual gamers … As the overlap between markets increases, firms may have incentive to escalate competition … On the contrary, firms competing with less market overlap face less competition for local customers…"). Itch.io is an example of a platform that specializes in a smaller segment, focusing mainly on smaller indie games. The platform is a favorite among players of these games, preferred even over large platforms such as Steam and EGS. See Jordan Minor, "itch.io Review," *PCMag*, July 14, 2023, available at https://www.pcmag.com/reviews/itchio, accessed on May 16, 2024 ("Itch.io, active since 2013, is a digital game store dedicated to curating and highlighting indie games you won't find anywhere else. It includes fantastic tools for buyers and sellers alike. Know ahead of time that the library caters to a particular indie-centric audience. However, if you're tired of mainstream gaming blockbusters and want to explore the more artistic corners of what the medium has to offer, check out the itch.io marketplace."); Data Next, "Gaming Culture in 2023: Trends and Top Companies," available at https://www.datanext.ai/gaming-culture/, accessed on May 16, 2024 ("Itch.io stands out as a platform that empowers indie developers and experimental games.").

[313]   Dr. Schwartz illustratively labels the second platform in his PCM as "EGS," which he recognizes in his report. See Schwartz Report, ¶ 272 ("My model considers a competing platform to Steam; I illustratively use EGS."). But as he recognized in his deposition, this second platform in the PCM can be any other competitor platform or even the collection of all the other platforms that Steam competes with. See Schwartz Deposition, pp. 258:7–258:18 ("Q. … Would you agree that the Boik and Corts paper and your platform competition model assume only two platforms? A. I agree it assumes two platforms which can mean, as a matter of both economics and math, either two distinct platforms or one platform that is an individual platform and a second platform that is an aggregation of all of the low demand platforms. So economically and mathematically, those are equivalent.").

thus he assumes that beyond Steam, EGS makes up rest of the consumers demand when estimating the "demand disadvantage" parameter.[314]

194.   In sum, Dr. Schwartz's flawed assumptions drive his conclusion; his model assumes, rather than demonstrates, harm from the alleged PMFN. Moreover, Dr. Schwartz's failure to account for network effects or targeted entry strategies in his PCM leads to nonsensical predictions—such as negative profits for publishers on Steam in the as-is world—that contradict the reality of the video game industry. Considering its poor real-world empirical performance and many conceptual flaws, Dr. Schwartz's PCM cannot be relied upon to make predictions about the but-for world.

5.5.   Dr. Schwartz's PCM assumes, rather than demonstrates, common harm from the alleged PMFN to proposed class members; instead, individualized inquiry is required to establish harm

195.   Dr. Schwartz's PCM ignores the differences across publishers, their games, their consumers, and platforms, as well as the way these economic actors interact in the video game industry. Therefore, his model assumes, rather than demonstrates, common harm to proposed class members. To establish harm on a class-wide basis, Dr. Schwartz would need to account for these differences. This would require individualized inquiry into each publisher in the industry, their games, their consumers, their competitors, and the platforms on which they sell their games. Moreover, since Dr. Schwartz's PCM assumes one publisher and one game, it also fails to account for competitive dynamics between

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[314]   Whereas EGS is the only Steam competitor in Dr. Schwartz's PCM, EGS is not among Steam's competitors in his damages model. See Schwartz Report, ¶¶ 272, 375–376, p. 205, Figure 6. As Dr. Schwartz testified, he does not know who Steam's competitors would be in the but-for world or what their market shares would be in the but-for world. See Schwartz Deposition, pp. 99:21–100:8 ("Q. Do you believe that in the but-for world, ▇ will operate a platform with a market share of ▇ percent between 2017 and 2021? A. I don't know and I don't need to know. It doesn't -- what I need to know is what the but-for -- approximate but-for market share is for Valve who comprises the remaining roughly ▇ percent of the market and how that's distributed across the various platforms is not an essential element of my analysis."). 100:18–101:7 ("Q. So you're saying, for example, that ▇ share could be higher than ▇ percent and ▇ share could be lower than ▇ percent? A. What I'm saying is that there will be other platforms that will comprise the ▇ percent of the rest of the market. Whether it is comprised of ▇ ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇ only, whether it will be some subset of this group plus others who may have entered and failed or thought about entering and chose not to is not what is important."). 109:7–17 ("[A.] ... I don't know nor do I need to know what ▇▇▇▇▇▇▇▇▇▇▇ ▇▇▇▇▇▇▇▇ do in the but-for world. I don't need to know whether any of them would have had some form of distribution. All I need to know is that all the remaining competitors would have about ▇ percent of the market, ▇. How that's allocated I don't know.").

publishers, and for the fact that multiple games are owned by the same publisher. These are critical determinants of economic outcomes, both in the as-is and but-for worlds.[315]

196.   Boik and Corts explicitly make four sets of assumptions that Dr. Schwartz adopts, causing his PCM to presuppose, rather than demonstrate, his conclusion of class-wide harm. These assumptions, as I explained in Section 5.3, are as follows: (i) there is only one publisher that sells a single game; (ii) there are only two platforms—one incumbent and one potential entrant—and the entrant differs from the incumbent in only a single fixed and persistent way, that is, the "demand disadvantage" of the entrant is not allowed to change with the entrant's share after entry; (iii) consumers' game purchase decisions depend only on the price of the game on the two platforms and the "demand disadvantage" of the entrant; and (iv) consumers respond to changes in the game price in the same way, irrespective of which of the two platforms this game is sold on.

197.   However, as I discussed in Section 5.3, in reality, the video game industry is characterized by different and multiple publishers, selling different and multiple games, on multiple and differentiated platforms, to consumers who have different tastes and preferences for characteristics and features of these games and platforms. Publishers consider these differences in consumers' tastes and preferences when developing, marketing, and

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[315]   See, e.g., Paul Belleflamme and Martin Peitz, "Managing Competition on a Two-Sided Platform," *Journal of Economics & Management Strategy*, 28(1), 2019, pp. 5–22 at p. 5 ("[T]he economic literature on two-sided platforms focuses on cross-group external effects … However, in many economic environments, platforms have to factor in the fact that the attractiveness of a platform for the members of one group also depends on the participation of the members of the very same group. That is, there exist within-group external effects, which platforms have to take into account when choosing their strategies … For instance, given a set of buyers on the platform, the expected profits of sellers on Ebay decrease in response to the entry of competing sellers. Similarly, if an additional competing shop opens in a shopping mall, the expected profits of the existing shops decrease given a set of buyers in the mall … Negative within-group effects may also arise because of congestion problems—for instance, sellers may compete for buyer attention, which is scarce."). Further, Armstrong (2006) discusses an example of a platform's consideration of seller competition in the context of shopping malls, where the mall represents the platform and shops within the mall represent sellers. See Mark Armstrong, "Competition in Two-Sided Markets," *The RAND Journal of Economics*, 37(3), 2006, pp. 668–691 at p. 686 ("An interesting issue concerns the extent of competition between retailers within platforms. For instance, a television channel might charge more for a car ad if it promised not to show a rival manufacturer's ad in the same slot. A shopping mall might charge a higher rent to a retailer with the promise that it will not let a competing retailer into the same mall. Implementing competition within a platform will often mean that retailers' prices and profits are lower than they would be with monopoly retailers. Thus we may expect that if the platform allowed retailing competition, it would make less money from the retailing side of the market but more money from the consumer side (if it charged consumers for entry)."). See, e.g., Mark Armstrong and John Vickers, "Multiproduct Pricing Made Simple," *Journal of Political Economy*, 126(4), 2018, pp. 1444–1471 at p. 1444 ("The theory of multiproduct pricing is a large and diverse subject. Unlike the single-product case, a multiproduct firm must decide about the structure of its relative prices as well as its overall price level."); Volker Nocke and Nicolas Schutz, "Multiproduct-Firm Oligopoly: An Aggregative Games Approach," *Econometrica*, 86(2), 2018, pp. 523–557 at pp. 523–524 ("In contrast to single-product firms, a multiproduct firm must choose not only how aggressive it wants to be in the market place but also how to vary its markups across products within its portfolio. In contrast to monopolistically competitive firms, an oligopolistic multiproduct firm must take self-cannibalization into account, both when setting its markups and when deciding which products to offer.").

monetizing their games.[316] As Dr. Schwartz himself acknowledges, these differences in consumers' preferences are reflected in the characteristics of the games that publishers bring to the market, where they decide to sell these games, and the prices they set for these games.[317] By ignoring these differences in his PCM, Dr. Schwartz assumes his conclusion that the alleged PMFN would result in class-wide harm.

198.   To demonstrate why this variation in consumers' preferences directly affects the implications of Dr. Schwartz's PCM, and thus its ability to demonstrate class-wide harm, I consider an example of games from two very different publishers: EA and Finji. EA is a large publisher that has published hundreds of titles across a wide range of genres, and owns some of the biggest titles in gaming, including shooters like *Apex Legends* and sports games like *Madden NFL*.[318] Finji has published a handful of games, some developed by

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[316]   Academic literature and industry articles acknowledge that product differentiation is a common strategy firms use to compete for customers with varying preferences. See, e.g., R. Preston McAfee, *Competitive Solutions: The Strategist's Toolkit*, (Princeton: Princeton University Press, 2002), p. 61 ("A key business strategy involves differentiating one's product from competitors' offerings. The simple advantage of differentiation is uniqueness—offering a product that no one else sells."); Jeffrey Church and Roger Ware, *Industrial Organization: A Strategic Approach*, (Boston: McGraw-Hill, 2000), p. 368 ("Everyday experience immediately suggests that there are many markets in which products are differentiated. By differentiated we mean that the products of different firms are not identical: consumers can and do distinguish between the products of different sellers. However, differentiated products are also similar: they are viewed by consumers as substitutable, usually because they are functionally interchangeable."). See also Scott A. Porter, "Chapter 1 | Competition that Helps Gaming Companies Innovate," *EY*, available at https://www.ey.com/en_us/insights/media-entertainment/what-s-possible-for-the-gaming-industry-in-the-next-dimension/chapter-1-competition-that-helps-gaming-companies-innovate, accessed on May 10, 2024 ("With customer expectations rising dramatically, a key pillar of success will be continuous innovation and product differentiation, and gaming executives clearly recognize this. For example, 83% of those surveyed say that the gaming industry is under constant pressure to innovate and create new gaming experiences."); David Panhans et al., "Gaming & Esports: Media's Next Paradigm SHIFT," *BCG*, December 25, 2021, available at https://www.bcg.com/publications/2021/gaming-and-esports-sector-are-the-next-shift-in-media, accessed on May 10, 2024 ("Games and the publishers behind them compete across a landscape of different genres (Exhibit 1) and platforms (mobile, PC, and console – discussed in next section). Even within a specific genre, the differences between titles is stark. From graphics and game mechanics, to the overall theme and subject matter, consumers have an immense selection to choose from. Some genres are sub-genres of others (e.g., Multiplayer Online Battle Arena, or MOBAs, came from Strategy games) and some titles are hybrids of genres (e.g., GTA is an action/adventure sandbox with some role-playing game elements). While no standard classification exists, the industry does a good job of self-managing the categorization of genres."); Dwight Pavlovic, "Video Game Genres: Everything You Need to Know," *HP*, July 23, 2020, available at https://www.hp.com/us-en/shop/tech-takes/video-game-genres, accessed on May 6, 2024 ("Although video game genres were once fairly clear cut, that's simply not the case these days. There's a growing variety of genres and sub-genres to understand, especially as game developers mix and blend different types of games in new and unexpected ways. That means the video-gaming landscape is constantly evolving. Studios work on tight schedules and follow trends when the opportunity arises.").

[317]   Schwartz Report, ¶¶ 65–67.

[318]   Electronic Arts, "About EA," available at https://www.ea.com/about, accessed on May 10, 2024 ("Through our cutting-edge games, innovative services, and powerful technologies, we bring worlds with infinite possibilities to nearly 600 million active players and fans around the globe, and are recognized for a portfolio of critically acclaimed, high-quality brands such as EA SPORTS FC™, Battlefield™, Apex Legends™, The Sims™, Madden NFL, Need for Speed™, Titanfall® and F1®.").

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itself, and others made by other small, independent game developers.[319] **It is unrealistic to assume that the pricing incentives and consumer responses to price changes for each of these publishers, and all of their games, are identical.**[320]

199.   EA publishes a racing game series called *Need for Speed*. A recent multiplayer game in this series, *Need for Speed Unbound*, currently has a base price of $69.99 on Steam and EGS, and has a large consumer base.[321] In contrast, *Night in the Woods* by Finji is a single-player, narrative-based game that has a base price of only $19.99—less than one-third the price of *Need for Speed Unbound*.[322] The fact that *Need for Speed Unbound* has a large consumer base, even though it is sold at a relatively high price, suggests that consumers place a high value on non-price game characteristics of this game and their demand for the game would be less sensitive to price changes. This suggests that EA, the publisher of *Need for Speed Unbound*, will face consumers with a lower own-price sensitivity

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[319]   Finji, "About," available at https://finji.co/about.html, accessed on May 10, 2024 ("Our Mission is to make new games and create new opportunities. We are based in Grand Rapids, Michigan, but collaborate with talented individuals from all over the place. Reborn in 2014, Finji was originally founded by Adam and Rebekah Saltsman in 2006. We are passionate game makers who sometimes work odd hours, but we practice inclusive team policies that support good quality of life (no crunch), and provide significant revenue shares for all team members.").

[320]   Furthermore, for large publishers like EA that publish a wide range of titles, it is similarly unrealistic that all of their titles will face the same pricing incentives and consumer responses to price changes. As discussed in footnote 270 of Section 5.3, in the Boik and Corts model—and in Dr. Schwartz's PCM—the parameters b and d represent consumers' own- and cross-price sensitivities, that is, how consumer demand for the game in the model on a given platform will change in response to a change in price on the same or the competing platform, respectively. Since the responses of consumers to price changes are expected to be different across different games, it means that these price sensitivity parameters in Dr. Schwartz's PCM (i.e., parameters b and d) are expected to have different values for different publishers facing differentiated consumers with different preferences across games and platforms.

[321]   Steam, "Need for Speed™ Unbound," available at https://store.steampowered.com/app/1846380/Need_for_Speed_Unbound/, accessed on May 8, 2024 ("Current Price: $69.99"); Epic Games Store, "Need for Speed™ Unbound," available at https://store.epicgames.com/en-US/p/need-for-speed-unbound, accessed on May 10, 2024; GameSensor, "Need for Speed Unbound: Sales Soar to $14 Million in First Month on Steam," February 23, 2023, available at https://gamesensor.info/news/need_for_speed_unbound_sales, accessed on May 10, 2024 ("According to GameSensor's estimations, during the first month of its release on Steam, Need for Speed Unbound generated a staggering revenue of almost $14 million and sold nearly 200,000 copies. These impressive figures are a testament to the game's popularity and its appeal to fans of the racing genre. The game's success is not surprising, given the buzz surrounding its release. More than 100,000 players added the game to their wishlist a month before its release on Steam, demonstrating the anticipation and excitement for the game."); Giant Bomb, "Need for Speed," available at https://www.giantbomb.com/need-for-speed/3025-483, accessed on May 10, 2024 ("[A]t least 150 million copies of *NFS* games have been sold, making it the best-selling racing game franchise to date.").

[322]   Steam, "Night in the Woods," available at https://store.steampowered.com/app/481510/Night_in_the_Woods/, accessed on May 8, 2024; Epic Games Store, "Night in the Woods," available at https://store.epicgames.com/en-US/p/night-in-the-woods, accessed on May 10, 2024 ("Base Game: $19.99.").

parameter in Dr. Schwartz's PCM, as compared to Finji, the publisher of *Night in the Woods*.[323]

200.   Further, the *Need for Speed* series is in the racing genre—a genre where playing with a controller is often preferred to using a mouse and keyboard.[324] Compared to other PC platforms, Steam has consistently invested in features enabling players to easily use a controller.[325] As a result, a player interested in *Need for Speed* may find playing the game more appealing on Steam than on platforms that do not support controllers. In contrast, since *Night in the Woods* is a single-player, narrative-based game, it will not benefit from Steam's controller features or social features in the same way.[326]

201.   Because consumers who play *Need for Speed* receive more benefits from Steam's features than consumers who play *Night in the Woods*, price changes for each game will have a different impact on consumer demand. *Need for Speed* users may be more reluctant to leave Steam, and thus be less responsive to price increases on Steam or price reductions on EGS. This will be reflected in smaller own- and cross-price sensitivity for *Need for*

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[323]   In the context of the example of *Need for Speed Unbound* versus *Night in the Woods*, one would expect that each game's consumers would have different own-price sensitivity parameter values (i.e., different b parameter values) due to, for instance, non-price game characteristics and availability of comparable games as substitutes. This implies, for example, that consumers would likely respond differently to a $5.00 price increase of *Need for Speed Unbound* from $69.99 to $74.99 than they would to the same increase for *Night in the Woods* from $19.99 to $24.99. Critically, Dr. Schwartz's PCM cannot accommodate this realistic nuance of the video game industry.

[324]   Mark Sammut, "PC Games That Play Better with A Controller," *GameRant*, April 27, 2024, available at https://gamerant.com/pc-games-better-with-controller, accessed on May 10, 2024 ("Most racing games generally play better with a controller than a keyboard or mouse. For racing sims, a quality wheel is the way to go, but the same doesn't always hold true for arcade racers. When driving the fastest cars in Forza Horizon 5, players might find themselves most comfortable with a controller as the vehicles tend to be easier to direct.").

[325]   Steam News, "New! Find Great Games To Play With DualShock and DualSense Controllers," November 20, 2023, available at https://store.steampowered.com/news/app/593110/view/3823053915988527061, accessed on May 8, 2024 ("Today's Steam update expands on that foundation to help the millions of players with PlayStation's DualShock and DualSense controllers easily find games to play with those devices.... We have upgraded the Controller-Friendly hub on Steam to make it easier to explore by controller type. By default Steam will set a filter based on the controller we've seen you play with recently, but you can also manually select any of the major controller models to adjust the filters.").

[326]   In contrast, games with multiplayer game modes such as *Need for Speed* benefit from Steam features such as Multiplayer matchmaking, Valve Anti-Cheat, Friends List, and Steam Chat. See Luke Reilly, "Need for Speed Unbound Review," *IGN*, December 9, 2022, available at https://www.ign.com/articles/need-for-speed-unbound-review, accessed on May 16, 2024 ("There *is* a way to engage with Unbound without this story layer, as the cross-play enabled online multiplayer is a separate mode that does away with it and focuses purely on racing and upgrading your ride."); Steam Support, "Steam Friends & Chat," available at https://help.steampowered.com/en/faqs/view/595C-42F4-3B66-E02F, accessed on May 16, 2024; Steamworks, "Multiplayer," available at https://partner.steamgames.com/doc/features/multiplayer, accessed on May 16, 2024; Steamworks, "Valve Anti-Cheat (VAC) and Game Bans," available at https://partner.steamgames.com/doc/features/anticheat, accessed on May 16, 2024.

Speed's consumers, as compared to consumers of *Night in the Woods*, in Dr. Schwartz's adaptation of the Boik and Corts model.[327]

202. Despite these differences, by only including a single game in his PCM, Dr. Schwartz does not allow for even the possibility that games like *Need for Speed* and *Night In the Woods* could have different price sensitivities.[328] By failing to allow for games to have different parameter values in consumers' demand, Dr. Schwartz assumes a one-size-fits-all approach to a complex industry, and his model is thus unable to demonstrate injury on a class-wide basis.

203. In addition to failing to capture differences across publishers, their games, and their consumers, Dr. Schwartz's PCM also fails to capture the interaction and the competitive dynamics among proposed class members.[329] Moreover, through the assumption of a single publisher and single game, his PCM also ignores the fact that multiple games can be developed, marketed, and sold by the very same publisher on the same platform as well as across multiple platforms.[330] Such competitive interactions among publishers and the ownership of multiple games by the same publisher are important factors that would influence the range of the economic outcomes across proposed class members.

204. For example, consider how, in the real world, several thousand publishers are on Steam but not EGS. Dr. Schwartz's PCM cannot explain the behavior of these firms. Some of these firms may be motivated to set prices that maximize benefits from network effects and discoverability or believe that their audience has limited cross-platform price sensitivity. Other publishers may price their games the same across platforms for

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[327]   And it is not only the case that these price sensitivities are expected to be different across these two games, but they would also be different depending on whether the games are offered on Steam versus EGS.

[328]   More precisely, Dr. Schwartz's PCM does not allow for consumers' preferences to change based on the differences in the characteristics of the games and features of the platform, and thus it does not allow for the single non-price determinant of consumers' demand in his PCM (i.e., "demand disadvantage") to be different across games.

[329]   See, e.g., Paul Belleflamme and Martin Peitz, "Managing Competition on a Two-Sided Platform," *Journal of Economics & Management Strategy*, 28(1), 2019, pp. 5–22 at p. 5; Mark Armstrong, "Competition in Two-Sided Markets," *The RAND Journal of Economics*, 37(3), 2006, pp. 668–691 at p. 686.

[330]   See, e.g., Mark Armstrong and John Vickers, "Multiproduct Pricing Made Simple," *Journal of Political Economy*, 126(4), 2018, pp. 1444–1471 at p. 1444. See also Ubisoft, "History of our Projects," available at https://www.ubisoft.com/en-us/company/careers/locations/articles/the-history-of-our-projects, accessed on May 13, 2024 ("Throughout the years, it has released more than 20 titles, ranging from small casual to big open-world games, and covering a wide range of platforms & technologies."); Callum Williams, "Every Rockstar Game Ever Released: A Full History," *IGN*, March 20, 2024, available at https://www.ign.com/articles/all-rockstar-games, accessed on May 13, 2024 ("In total, there have been 47 games released by Rockstar."); PCGameBenchmark, "PC Games Published by Square Enix," available at https://www.pcgamebenchmark.com/pc-games-published-by-square-enix, accessed on May 13, 2024 ("There are 170 PC games published by Square Enix.").

reputational or brand management reasons.[331] Dr. Schwartz's model has not shown that these types of publishers, with these types of preferences, will be harmed by the alleged PMFN, because his model does not allow for the complexity of their preferences and incentives. Dr. Schwartz merely assumes that firms with these types of preferences will act the same as any other firm in his model, despite the evidence that they do not.

205.   By ignoring these interactions and incentives, Dr. Schwartz's PCM assumes away their impact on economic outcomes of proposed class members. Therefore, **even if Dr. Schwartz were to run his PCM one-by-one separately for each publisher, he would still fail to establish common harm for all proposed class members. This is because his PCM fails to account for the competitive dynamics between these publishers and their games as well as for the fact that multiple games are owned by the same publisher.** To measure harm to the proposed class members, Dr. Schwartz must put forth a model that accounts for the wide range of circumstances facing individual members of the proposed class, which he has not. Individualized inquiry is required to account for both these factors and the impact of these factors on the economic outcomes and damages for the proposed class members.

206.   In sum, Dr. Schwartz's adaptation of the stylized theoretical Boik and Corts model in his PCM is incapable of establishing common harm for proposed class members with common proof. Dr. Schwartz adopts the Boik and Corts model along with its extreme simplifications that assume away critical differences across types of publishers, their games, the platforms on which these games are sold, and the characteristics and price sensitivities of different types of consumers for these publishers. These unwarranted simplifications allow him to assume, rather than demonstrate, common harm across proposed class members.

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[331]   ████████████ Deposition, pp. 44:13–45:15 ("We're very intentional about trying to have the right price for the product and to meet customers' expectations and ultimately then we want our pricing to be consistent and give customers choice whether they buy the game, subscribe to ████████, buy it on console, buy it on PC, buy it at our store, buy it on Steam or somewhere else. We try to give customers choice. But when they do buy a game from us, we want that price to always be consistent. Because if we don't, we'll have quite a bit of backlash. And gamers are quite vocal on social media and what have you. So, you know, it just would not be smart for us because we think about customer sentiment in our business.").

6.   Dr. Schwartz's proposed "yardstick approach" is unreliable and cannot establish class-wide harm through a common methodology

207.   In addition to his damages model and PCM, Dr. Schwartz proposes a "yardstick approach," concluding that "all or virtually all putative class members were impacted by the supracompetitive fees charged by Valve."[332] A yardstick approach or analysis "typically compares the plaintiff's business to another business that is substantially similar" to attempt to capture a firm's behavior or success in the but-for world.[333] While a yardstick analysis is a known antitrust methodology, it is only reliable when the appropriate benchmark firms exist and are used for the analyzed firm and industry. Dr. Schwartz's proposed benchmarks differ in the services they provide, making them inappropriate benchmarks under the yardstick approach. As a result, his proposed yardstick approach cannot establish class-wide harm through a common methodology.

208.   **The reliability of the yardstick approach hinges upon the closeness of the analyzed firm and the benchmark firms.** When a before-and-after analysis is unavailable or impractical (e.g., because there is no "before" period for the alleged conduct),[334] econometricians may consider a yardstick approach. However, as the literature Dr. Schwartz cites explains, the yardstick approach "faces greater obstacles than the before-and-after method, because it requires the plaintiff to show the comparability of either a different firm from itself, or of a different market from its market, or both"[335] and is "nonetheless vulnerable to arguments that the yardstick candidate differs from the plaintiff's business in ways which make the comparison meaningless and render the plaintiff's damage estimate

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[332]   Schwartz Report, ¶ 301.

[333]   Roger D. Blair and Amanda Kay Esquibel, "Yardstick Damages in Lost Profits Cases: An Econometric Approach," *Denver University Law Review*, 72(1), 1994, pp. 113–136 at pp. 113–114.

[334]   A "before and after" analysis compares the same firm before and after the alleged conduct. See, e.g., Roger D. Blair and Amanda Kay Esquibel, "Yardstick Damages in Lost Profits Cases: An Econometric Approach," *Denver University Law Review*, 72(1), 1994, pp. 113–136 at p. 113 ("The before-and-after approach compares the plaintiff's business to itself during different time periods, before and after the wrongful act."); Theon van Dijk and Frank Verboven, "Quantification of Damages," in *3 Issues in Competition Law Policy*, ABA Section of Antitrust Law, (Chicago: American Bar Association, 2008), pp. 2331–2348 at p. 2335 ("In this method the prices that prevailed before and after the collusive period are used to estimate the prices that would have emerged during the collusive period had the collusion not taken place."); Roger D. Blair and William Page, "'Speculative' Antitrust Damages," *Washington Law Review*, 70(2), 1995, pp. 423–463 at p. 443 ("The plaintiff will normally attempt to prove causation by showing that it was flourishing until the defendant acted illegally. This so-called before-and-after method of proof is the prototype for proof of damages.").

[335]   Roger D. Blair and William Page, "'Speculative' Antitrust Damages," *Washington Law Review*, 70(2), 1995, pp. 423–463 at p. 453.

speculative."[336] This same literature notes that businesses can be found not comparable if their product lines are different, if the methods of distribution are different, or if their financial structures are different.[337]

209.   Indeed, a reliable comparison for Steam may not even exist; the yardstick approach *can* be a useful tool, but it need not always be. For example, the literature indicates that benchmark firms can be similar products in the same geographic market or the same products in different geographic markets.[338] Supposing that the relevant geographic market is global as Dr. Schwartz opines,[339] he is limited to finding a similar product. But there is no guarantee that a similar enough product exists.

210.   **The benchmark firms Dr. Schwartz provides are an inappropriate comparison group.** Dr. Schwartz "deems" that eBay, Amazon, Walmart, Etsy, Airbnb, and VRBO are comparable to Steam in terms of "a variety of criteria."[340] However, there is at least one reason to believe that these firms are dissimilar to Steam. As Dr. Schwartz testified, the services provided by his benchmark firms end when a transaction is complete.[341] By contrast, as discussed in Section 3.1 and Section 4.2.4, Steam provides ongoing services to its consumers after the purchase transaction,[342] including, for example, the ability to download and replay a video game any number of times across multiple PCs, continued support for multiplayer use, and access to changing user-generated content. In fact,

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[336]   Roger D. Blair and Amanda Kay Esquibel, "Yardstick Damages in Lost Profits Cases: An Econometric Approach," *Denver University Law Review*, 72(1), 1994, pp. 113–136 at p. 117.

[337]   Roger D. Blair and Amanda Kay Esquibel, "Yardstick Damages in Lost Profits Cases: An Econometric Approach," *Denver University Law Review*, 72(1), 1994, pp. 113–136 at pp. 118–119 ("The district court identified several ways in which the two businesses were not comparable. First, the product lines were different. While the plaintiff had a single product, the defendant's business was more diversified. Second, the methods of distribution differed considerably. The plaintiff's business had little sales organization compared to the defendant's national system. Third, significant differences existed between the financial structures of the two firms. The plaintiff's business was minimally capitalized, while the defendant's business was adequately capitalized.").

[338]   Theon van Dijk and Frank Verboven, "Quantification of Damages," in *3 Issues in Competition Law Policy*, ABA Section of Antitrust Law, (Chicago: American Bar Association, 2008), pp. 2331–2348 at p. 2336 ("These yardsticks can be other product markets in the same state or country that are similar in terms of demand, cost, and market structure conditions, or they can be the same product markets in other states or countries.").

[339]   Schwartz Report, ¶ 48.

[340]   Schwartz Report, ¶ 284, Table 4.

[341]   Schwartz Deposition, pp. 244:19–245:12 ("Q. Now, are there differences in post-sale duties between Steam and a retail goods seller like Amazon or a home rental site like Airbnb and VRBO? A. I'm not sure what you have in mind. Q. Well, let me tell you. So if I buy something on Amazon, they deliver it to my door, and unless I need to send it back for a refund, I'm pretty much done with that transaction, correct, from Amazon's perspective? … The Witness: Assuming that there's no problem or nothing that would require intervention by Amazon, they charge you correctly, I would agree, the transaction is complete.").

[342]   For example, Steam keys can be purchased on Amazon, one of Dr. Schwartz's benchmarks. A customer's transaction with Amazon would conclude at the purchase of the key, but Steam would continue to provide services for that game in the future.

Steam has continued to provide new features over time that can improve a consumer's experience with a previous purchase.[343] In this way, Steam is sufficiently differentiated from Dr. Schwartz's benchmark firms so that their revenue shares are not comparable for antitrust harm.[344]

211.   As an example, consider *Terraria*, a 2D sandbox game centered around exploring, combat, and crafting, developed by Re-Logic and published by 505 Games on Steam in 2011.[345] Industry press indicates that *Terraria* has great "replay" value due in part to its randomization, regular updates, and user-generated modifications.[346] Therefore, beyond enabling the original transaction, Steam provides continued support to consumers who could have purchased *Terraria* over a decade ago—consumers who since could have

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[343]   For example, Steam introduced the Steam Workshop—a hub to publish and download user-generated content—in 2011, and introduced In-Home Streaming—allowing users to stream games to other devices in their homes—in 2014. See Steam, "Steam Workshop Lets Item Creators Compensate Toolmakers, Communities, and Mentors," June 27, 2013, available at https://steamcommunity.com/games/SteamWorkshop/announcements/detail/1819734886367365945, accessed on May 11, 2024; Steam, "Steam Announces Family Sharing," September 13, 2013, available at https://store.steampowered.com/oldnews/11436, accessed on May 11, 2024.

[344]   In deposition, Dr. Schwartz testified that such ongoing support provided by Steam are "fixed costs of having a platform." See Schwartz Deposition, pp. 247:15–248:5 ("Q. And provide services that make the game work, provide an enjoyable experience, et cetera? A. Those are table stakes for having a platform. I mean, that's not nothing to do with the transaction. Those are the fixed costs of having a platform, and you incur those costs whether I sell a game or not, you incur those costs whether everybody in this room joins Steam or none of us join Steam. Those aren't related to the transaction. Those are the costs of operating the platform and you incur those costs regardless of any individual transaction that takes place."). First, the economic literature finds that prices and fixed costs work differently for information goods where cost-based pricing "doesn't work." See Carl Shapiro and Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy*, (Boston: Harvard Business School Press, 1999), p. 3 ("Economists say that production of an information good involves *high fixed costs* but *low marginal costs* ... This sort of cost structure has many important implications. For example, cost-based pricing just doesn't work: a 10 or 20 percent markup on unit cost makes no sense when unit cost is zero. You must price your information goods according to consumer value, not according to your production cost."). Second, because Steam offers additional features over time—and almost certainly in ways it cannot predict 10 years in advance—it cannot possibly include these costs as "fixed" at the time it makes sales.

[345]   Terraria, "Terraria," available at https://terraria.org/, accessed on May 10, 2024 ("Blending elements of classic action games with the freedom of sandbox-style creativity, Terraria is a unique gaming experience where both the journey and the destination are as unique as the players themselves!"); Steam, "Terraria," available at https://store.steampowered.com/app/105600/Terraria/, accessed on May 11, 2024.

[346]   Christian Meffert, "Best Games with Infinite Replayability," *Game Rant,* January 20, 2024, available at https://gamerant.com/best-games-replay-value/, accessed on May 10, 2024 ("Another similarity to Minecraft is that Terraria has procedurally generated worlds. This randomization is at the heart of Terraria's infinite replayability, as players are guaranteed to have a different experience every time they start a new world and embark on a new adventure."); Luke Ackroyd, "12 Open-World Games with The Best Replay Value," *The Gamer,* available at https://www.thegamer.com/open-world-games-replayability-new-game-plus/, accessed on May 10, 2024 ("Terraria is a fantastic, open-world 2D sandbox with so much content to enjoy. You can go off in any direction, deep down into cave systems or up to floating islands. The game allows you to play your own way, exploring, fighting tough monsters, and building your own little home, full of friendly NPCs. There are plenty of ways to keep the game fresh and exciting, from texture packs to fancy mods. With each playthrough, you can set your own goals and challenges. Perhaps you might try and get the most expensive items in the game or take down a boss you missed before. There is so much content that you can easily overlook, especially with regular updates, such as cross-overs with other games. Terraria is a massive sandbox for you to sink hours and hours into.").

downloaded the game across multiple PCs, downloaded recurring developer updates through Steam, and downloaded modifications to the game created by the Steam community. These services have no parallel in e-commerce marketplaces or vacation home marketplaces like the firms that Dr. Schwartz considers.

212.   Beyond comparing Steam to inappropriate firms, Dr. Schwartz ignores more direct benchmark firms. **Console platforms have similar revenue shares to Steam, but Dr. Schwartz excludes console platforms from his yardstick approach.** Like Steam, console platforms distribute the same type of product (video games) in the same area (worldwide) and offer similar services (lifetime ability to play a given game on a given console). Industry press indicates that console platforms charge similar revenue shares to Valve,[347] but Dr. Schwartz rejects this obvious comparison. He testified that that console platforms are "infected" by Valve's alleged anticompetitive behavior.[348] However, Dr. Schwartz's testimony is at odds with the timing in the industry. As an initial matter, PlayStation and Xbox were launched worldwide in 1995 and 2002, both before Steam in 2003.[349] Further, according to Prof. Rietveld, ██████████████████████████████████ ██"[350] In contrast, as early as 2006, Microsoft was charging third parties a 30 percent revenue share to

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[347]   Tom Marks, "Report: Steam's 30% Cut Is Actually the Industry Standard," *IGN*, January 13, 2020, available at https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard, accessed on May 6, 2024 ("On the console side of things, the 30% baseline holds true. IGN was told this 30% also includes the licensing fees associated with publishing your game on each system. One source even explained that Nintendo used to take a 35% cut from games released as part of WiiWare, but has adjusted its policy since to be in line with its competitors.").

[348]   Schwartz Deposition, pp. 251:10–252:12 ("Q. There are other video game platforms that you could have used as benchmarks, for example GOG or Green Man Gaming or Xbox or PlayStation or Nintendo; correct? A. I could have. Q. Why didn't you? A. I think the other gaming platforms are infected by the anticompetitive behavior in which Valve engages, so I don't think that would be a reasonable benchmark. Q. So do you think that the Xbox and PlayStation are infected by that behavior? [A.] I think Xbox and PlayStation and other digital platforms suffer from some of the same defects in that their rates are pegged to other platforms that charge a given level which, through several degrees of separation, trace back to Valve.").

[349]   Jason Arriola, "All PlayStation Console Generations in Order of Release," *Insider Gaming*, October 10, 2023, available at https://insider-gaming.com/all-playstation-console-generations-in-order-of-release/, accessed on May 16, 2024 ("The original PlayStation console got its start in 1994 in Japan, and 1995 in North America and Europe, respectively."); Mitch Dyer, "The Life and Death of the Original Xbox," *IGN*, February 19, 2020, available at https://www.ign.com/articles/2011/11/23/the-life-and-death-of-the-original-xbox, accessed on May 16, 2024 ("November 15, 2001 marked the company's first console release, and Halo, its premier first-party title, shattered software sales records... With the Xbox exploding, 2002 looked like a hell of a year. The system launched in Europe and Japan.").

[350]   Class Certification Expert Report of Professor Joost Rietveld, February 8, 2024, ¶ 126 ("in the early days of Valve, ██████████████████████████████████. However, in or around 2011, Valve began to execute most of its developer agreements at a 70/30 revenue share").

distribute games on its Xbox Live platform.[351] As such, it cannot be that Valve "infected" console platforms when setting a 30 percent revenue share, since that rate on console platforms predates Valve's use of a 70/30 revenue share for most of its agreements.

213.   In sum, because the services provided by Dr. Schwartz's benchmark firms do not adequately resemble Steam's, there is no reason to believe that Dr. Schwartz's yardstick approach provides any evidence regarding the revenue share that Valve might have charged in the but-for world. As a result, Dr. Schwartz has not established class-wide harm through a common methodology in this case. In fact, the most obvious benchmark comparison—console distribution platforms—would indicate that Valve's revenue share is not elevated but competitive.[352]

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[351]   Matt Casamassina, "Xbox Live Arcade Easy Money for Publishers," IGN, February 9, 2006, available at https://web.archive.org/web/20060228233903/https://xbox360.ign.com/articles/687/687336p1.html,   accessed on May 17, 2024 ("Third parties who port their classics over to [Xbox Live Arcade] take home 70% of the profits -- the remaining 30% going to Microsoft."). See also James Lee, "Microsoft Take Up To 60 per cent of Community Games Revenue," *GamesIndustry.biz*, March 30, 2009, available at https://www.gamesindustry.biz/microsoft-takes-up-to-60-per-cent-of-community-games-revenue, accessed on May 17, 2024 ("Microsoft takes a baseline cut of 30 per cent").

[352]   Tom Marks, "Report: Steam's 30% Cut Is Actually the Industry Standard," *IGN*, January 13, 2020, available at https://www.ign.com/articles/2019/10/07/report-steams-30-cut-is-actually-the-industry-standard, accessed on May 6, 2024.

7.   Conclusion

214.   I was asked by counsel for Valve to analyze the economic validity of the claims made by Dr. Schwartz in his report with respect to his damages model, his Platform Competition Model, and his yardstick approach, and whether Dr. Schwartz's analyses are capable of establishing class-wide harm and estimating damages using common evidence. I find that they are not.

215.   With respect to Dr. Schwartz's damages analysis, his model is fundamentally flawed because it does not reflect economic reality: it fails to account for critical economic characteristics of video game consumers, developers, publishers, distributors, and the alleged PMFN itself. Dr. Schwartz ignores the differentiated features of distribution platforms that drive publishers' decisions regarding platform use. He assumes a common decline in proposed class members' revenue shares in the but-for world, but ignores Steam key use—which further drives publisher-level variation in effective revenue share rates in both the as-is and but-for worlds. He assumes that publishers would pass through changes in Valve's revenue share in a common fashion, despite his own estimates to the contrary. And he makes unsupported assumptions about the but-for world by ignoring network effects and the two-sided nature of video game distribution platforms. Dr. Schwartz repeatedly makes assumptions of commonality rather than demonstrating them, and, as I show, these assumptions impact whether—and to what degree— proposed class members would be harmed.

216.   With respect to Dr. Schwartz's PCM, his model's predictions are at odds with core facts of the video game industry, basic economics, and common sense. For example, he estimates negative economic profits and large marginal costs in the as-is world for the publisher, contradicting the fact that publishers are generally profitable in the real world and would likely exit if they earned negative profits over the long term. The PCM fails to make reliable predictions about the as-is world because it is based on a stylized theoretical model that was not designed to be taken directly to data. By assuming, for instance, a single game, single publisher, and two platforms with one-sided pricing, Dr. Schwartz's PCM fails to capture critical components of the differentiated and admittedly two-sided video game industry. By failing to model the economic behavior of multiple and differentiated participants to the industry, Dr. Schwartz's PCM fails to reliably depict how publishers make decisions in in the as-is world. For instance, Dr. Schwartz's assumption that the "demand disadvantage" in his PCM is large, fixed, and persistent, is at odds with

how two-sided platforms operate in an industry with network effects. As another example, Dr. Schwartz assumes there is a single game sold to a customer who only cares about the price of the game and the "demand disadvantage" across platforms, which assumes rather than demonstrates class-wide harm. For all these reasons and because Schwartz's PCM cannot reliably predict the as-is world, his PCM is ill-suited to predict what would happen in the but-for world.

217.   With respect to Dr. Schwartz's yardstick approach, the services provided by Dr. Schwartz's benchmark firms do not adequately resemble Steam's. As such, there is no reason to believe that Dr. Schwartz's yardstick approach provides any evidence regarding the revenue share that Valve might have charged in the but-for world. Therefore, this approach provides no reliable evidence of harm to proposed class members.

218.   In conclusion, Dr. Schwartz's PCM and yardstick approaches do not and cannot show class-wide antitrust impact using common proof, and his damages model does not and cannot estimate class-wide damages through a common methodology and evidence.

Executed this 17th day of May, 2024

Ashley Langer, Ph.D.

8.   Appendix A: CV and prior testimony for Dr. Ashley Langer

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McClelland Hall 401
Tucson, AZ 85721

Current Appointments:
> Associate Professor, Department of Economics, University of Arizona, 2021-present
> Research Associate, National Bureau of Economic Research, 2021-present

Past Appointments
> Visiting Scholar, Columbia Business School, Spring 2022
> Assistant Professor, Department of Economics, University of Arizona, 2013-2021
> Faculty Research Fellow, National Bureau of Economic Research, 2020-2021
> Adjunct Research Scientist, Ford School of Public Policy, University of Michigan, 2013-2016
> Visiting Scholar, Energy Policy Institute of Chicago, University of Chicago, Fall 2013
> Visiting Assistant Professor, Department of Economics, University of Arizona, 2012-2013
> Assistant Professor, Ford School of Public Policy and Department of Economics, University of Michigan, 2010-2013

Degrees:
> Ph.D.   University of California, Berkeley, Economics, 2010
> B.A.   Northwestern University, Mathematical Methods in the Social Sciences and Economics, 2002

Publications:
"Designing Dynamic Subsidies to Spur Adoption of New Technologies" (with Derek Lemoine)
> *Journal of the Association of Environmental and Resource Economists*, 9(6), November, 2022 (Winner of Ralph C. d'Arge and Allen V. Kneese Award for Outstanding Publication in the *Journal of the Association of Environmental and Resource Economists*)

"Escalation of Scrutiny: The Gains from Dynamic Enforcement of Environmental Regulations" (with Wesley Blundell and Gautam Gowrisankaran)
> *American Economic Review*, 110(8), August 2020, 2558-85

"From Gallons to Miles: A Disaggregate Analysis of Automobile Travel and Externality Taxes" (with Vikram Maheshri and Clifford Winston)
> *Journal of Public Economics*, 152, August 2017

"The Intergenerational Transmission of Automobile Brand Preferences" (with Soren Anderson, Ryan Kellogg, and James Sallee) *Journal of Industrial Economics*, 63(4), December 2015

"Automakers' Short-Run Responses to Changing Gasoline Prices"
> (with Nathan Miller), *Review of Economics and Statistics* 95(4), October 2013

"Toward A Comprehensive Assessment of Road Pricing Accounting for Land Use"
    (with Clifford Winston) *Brookings-Wharton Papers on Urban Affairs*, 2008
"The Effect of Government Highway Spending on Road Users' Congestion Costs"
    (with Clifford Winston) *Journal of Urban Economics* 60(3), 2006

Working Papers and Work in Progress:
"Fueling Alternatives: Gas Station Choice and the Implications for Electric Charging" (with
    Jackson Dorsey and Shaun McRae) *Conditionally Accepted at the
    American Economic Journal: Economic Policy*
"Policy Uncertainty in the Market for Coal Electricity: The Case of Air Toxics Standards"
    (with Gautam Gowrisankaran and Wendan Zhang) *Revise and Resubmit at the
    Journal of Political Economy*
"Energy Transitions in Regulated Markets" (with Gautam Gowrisankaran and Mar Reguant)
    Submitted
"What Were the Odds? Estimating the Market's Probability of Uncertain Events" (with Derek
    Lemoine)
"Ramping Costs and Coal Generator Exit" (with Miguel Borrero and Gautam Gowrisankaran)
"Regulating Power Plant Emissions: Environmental Justice, Enforcement, and Regulator
    Preferences" (with Gautam Gowrisankaran and Konan Hara)

Teaching:
    Dynamic Oligopoly in Environmental Economics (DSE Conference)
    Business Strategy, University of Arizona (MBA)
    Economics of Discrimination Reading Group
    Empirical Environmental Economics, University of Arizona (PhD)
    Environmental Economics, University of Arizona (Undergraduate)
    Honors Principles of Economics, University of Arizona (Undergraduate)
    Government Regulation of Industry and the Environment, University of Michigan
        (Masters in Public Policy)
    Energy and Environmental Policy, University of Michigan (Undergraduate)
    Microeconomics B: Cost-Benefit Analysis in Depth, University of Michigan
        (Masters in Public Policy)

Fellowships and Awards:
    2022   National Science Foundation Grant for "Regulating Electricity Markets:
                Impacts on Energy Transitions and Environmental Justice"
                (PI grant of $257,455, Co-PI Gautam Gowrisankaran)
    2021   Eller College Outstanding Economics Instructor Award
    2019   Sloan Foundation Grant for "Economics of Innovation in the Energy Sector"
                (With David Popp and NBER, $399,895)
                Eller Dean's Research Award for Assistant Professors
    2018   NBER Economics of Energy Use in Transportation Grant
                (With Shaun McRae, $15,000)

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	Kalt Prize for best graduate student placement in the Eller Business School (Jackson Dorsey, Kelley Business School at Indiana University)
2017	Center for Management Innovations in Health Care (With Derek Lemoine, $3,900)
	Eller Small Grant (With Derek Lemoine, $2,500)
2016	Institute of the Environment Program Development Grant (With Derek Lemoine, $15,000)
2015-2016	Eller Small Grant (With Derek Lemoine, $2,500)
2014-2016	University of Arizona Renewable Energy Network Grant (With Derek Lemoine, $15,000 each year)
2013-2014	University of Arizona Renewable Energy Network Grant ($15,000)
2011,2012	Faculty Teaching Honor Roll for Microeconomics B (twice), Energy Policy, and Government Regulation of Industry and the Environment
2009-2010	Association of American University Women Dissertation Fellowship
2008	U.C. Berkeley Dean's Normative Time Fellowship
2007-2008	Outstanding Graduate Student Instructor Award

Research Presentations (includes scheduled):

2024: NBER IO Winter Meeting, Utah Winter Business Economics Conference, Iowa State University, CalTech, Norwegian School of Economics, London School of Economics, Imperial College

2023: NBER IO Winter Meeting, NBER Economic Analysis of Regulation, University of Oregon, Arizona State University Empirical Microeconomics Conference, UC Davis, MIT CEEPR Research Workshop, SITE Conference, University of Houston, Texas A&M IO Day, Georgia Tech, Penn State, MIT

2022: Allied Social Science Association Conference, Cornell University (Applied Economics), Oxford University, Columbia University (Economics, Business, SIPA, CGEP), Decarbonization Seminar (Mannheim), University of Maryland (AREC), Resources for the Future, Environmental Protection Agency, Cowles Foundation Conference on Models and Measurement, Claremont McKenna, Stanford University, University of Toronto, Econometric Society Dynamic Structural Econometrics Conference (Australian National University)

2021: Allied Social Science Association Conference, University of Georgia, University of Albany, ZEW Mannheim Energy Conference, NBER Distributional Consequences of New Energy Technologies, University of Colorado

2020: Allied Social Science Association Conference, University of Arizona Quant Law Conference, Booth, Wharton, ETH/ZEW/CMCC/Grenoble Ecole de Management

2019: NBER Future of Energy Use in Transportation, Yale University Economics/SOM, University of Chicago (EPIC), NBER EEE Summer Institute, University of California Berkeley, University of Virginia Law School, National University Singapore, Jinan University, Triangle Resource and Environmental Economics Seminar, University of Calgary, University of California, San Diego

2018: Arizona State University, NBER Future of Energy Use in Transportation, University of Nevada, Reno, Cowles Foundation Conference on Structural

	Microeconomics, NBER Industrial Organization Summer Institute, NBER Environmental and Energy Economics Summer Institute, University of Maryland Environmental Tax Workshop, Georgetown University, Santa Barbara Occasional Workshop in Environmental Economics, Yale University School of Forestry and Environmental Studies
2017:	Stanford Institute for Theoretical Economics Conference, NBER Environmental and Energy Economics Summer Institute, MIT CEEPR Workshop
2016:	POWER Conference, IIOC Conference, AERE Annual Conference, Heartland Conference, University of Michigan Conference on Transportation, Energy, Economics and the Environment
2014:	University of Colorado Boulder Environmental and Resource Economics Workshop, University of California, Davis, University of Michigan Conference on Transportation, Energy, Economics and the Environment
2013:	Northeast Workshop on Energy Policy and Environmental Economics, American Environmental and Resource Economists (AERE) Annual Conference, NBER Summer Institute in Industrial Organization, Quantitative Marketing and Economics Conference, University of Chicago (Harris)
2012:	American Economic Association Annual Conference, University of Arizona, University of British Columbia, Copenhagen Business School
2011:	International Industrial Organization Conference, Midwest Bioenergy Conference, University of Chicago (Harris School), UC Berkeley (Energy Institute), Carnegie Mellon University (Heinz School)
2010:	Arizona State University, Columbia University, Michigan State University, Ohio State University, Stanford University, Tufts University, University of British Columbia, University of Maryland (Agricultural and Resource Economics), University of Michigan (Economics, Erb Institute, and Public Policy), University of Toronto, University of Wisconsin (Economics and Agricultural and Applied Econ.)
2009:	Collegio Carlo Alberto (MOOD Conference), San Francisco Federal Reserve, University of California, Berkeley (Economics, Business, and Public Policy)

External Service:

2024-	Board of Editors, *American Economic Review*
	Editorial Council, *Journal of the Association of Environmental and Resource Economists*
2022-	Associate Editor, *International Journal of Industrial Organization*
2021-	Editorial Council, *Journal of Environmental Economics and Management*
2021	Co-Organizer, 15th North American Meeting of the Urban Economics Association
2021	Presentation to Congressional Budget Office ("Recent Research on the Economics of Discrimination")
2015-2022	Program Committee for the Summer Conference of the Association of Environmental and Resource Economists

Graduate Advising (all UA):

Abbie Boatwright (chair), Yun-Ting Yeh (chair), Robert Baluja (chair), Wint Thu, Konan Hara (chair), Austin Drukker (chair), EK Green, Yujia Peng (chair), Paul Fisher (chair), Yuge Hao, Wei Zhou, Chase Eck (chair), Wendan Zhang (chair), Timothy Roberson (chair), Phuong Ho (co-chair), Arundhati Tillu, Jackson Dorsey (chair), SangUk Nam, Keith Meyers, Wesley Blundell (co-chair), Anatolii Kokoza, Kyle Wilson, Ahmad Mohassel (chair), Cong Liu, Charles He, Alex Hollingsworth, Michael Matheis, Soudeh Mirghasemi, Hoa Nguyen, Thiagarajah Subramaniam, Leila Asgari

Expert Reports and Testimony:

Guzman et al. v. Polaris Inc. et al., Expert Report (February 18, 2021), Expert Report (March 30, 2021), Deposition (April 1, 2021) engaged by counsel for Polaris Inc. et al.

Garcia et al. v. Volkswagen Group of America Inc. et al., Expert Report (August 11, 2021), Deposition (September 23, 2021) engaged by counsel for Volkswagen Group of America Inc. et al.

Berlanga v. Polaris Inc. et al., Expert Report (March 10, 2023) engaged by counsel for Polaris Inc. et al.

Connelley et al. v. Volkswagen Group of America Inc. et al, Expert Report (June 9, 2023), Deposition (August 1, 2023) engaged by counsel for Volkswagen Group of America Inc. et al.

American President Lines, LLC, et al. v. Matson Navigation Co. Inc., et al., Expert Reports (November 27, 2023 and January 11, 2024), Depositions (January 4, 2024 and January 30, 2024) engaged by counsel for Matson Navigation Co. Inc., et al.

In re College Athlete NIL Litigation, Expert Report (January 26, 2024), Deposition (March 19, 2024) engaged by counsel for defendants.

9.   Appendix B: Documents relied upon

Academic Articles

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- Bruno Jullien, Alessandro Pavan, and Marc Rysman, "Two-Sided Markets, Pricing, and Network Effects," *Handbook of Industrial Organization*, 4(1), 2021, pp. 485–592.

- Carmelo Cennamo and Juan Santalo, "Platform Competition: Strategic Trade-Offs in Platform Markets," *Strategic Management Journal*, 34(11), 2013, pp. 1331–1350.

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- Feng Zhu and Marco Iansiti, "Entry into Platform-Based Markets," *Strategic Management Journal*, 33(1), 2012, pp. 88–106.

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- Harvey E. Lapan and David A. Hennessy, "Unit Versus Ad Valorem Taxes in Multiproduct Cournot Oligopoly," *Journal of Public Economic Theory*, 13(1), 2011, pp. 125–138.

- Jacquelyn Pless and Arthur van Benthem, "Pass-Through as a Test for Market Power: An Application to Solar Subsidies," *American Economic Journal: Applied Economics*, 11(4), 2019, pp. 367–401.

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- José Tudón, "Distilling Network Effects from Steam," *Quantitative Marketing and Economics*, 20, 2022, pp. 293–312.

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- Mark Armstrong and John Vickers, "Multiproduct Pricing Made Simple," *Journal of Political Economy*, 126(4), 2018, pp. 1444–1471.

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- Robert S. Pindyck and Daniel L. Rubinfeld, *Microeconomics*, Eighth Edition, (Upper Saddle River: Pearson Education, 2013).

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Data

- Backup materials of Class Certification Expert Report of Steven Schwartz, Ph.D., February 8, 2024.

    o Schwartz Analysis Data ("PROD_Analysis_Data").

    o Schwartz Damages Rate Output ("Valve damages effective rate.rds").

- o Schwartz Model Inputs ("model_inputs.csv").

  - o Schwartz Passthrough ("Passthrough.rds").

  - o Schwartz Valve Market Share on Steam ("Valve share.rds").

- Steam Key Redemptions Data ("mst_valve_key_red").

- Steam Key Requests Data ("mst_valve_key_req").

Depositions

- Deposition of Kristian Miller (Valve), October 3, 2023.

- 30(b)(6) Deposition of Scott Lynch (Valve), October 13, 2023 and Exhibits.

- Deposition of Ricky Uy (Komodo), October 24, 2023.

- Deposition of Tom Giardino (Valve), November 2, 2023.

- Deposition of Merlyn Morgan-Graham (Wolfire), November 15, 2023.

- Deposition of Matt Nickerson (Valve), November 20, 2023.

- 30(b)(6) Deposition of David Rosen (Wolfire), November 30, 2023.

- Deposition of Sean Murray (Hello Games), January 11, 2024.

- Deposition of Aaron Greenberg (Microsoft), January 30, 2024.

- Deposition of Joost Rietveld, April 17, 2024.

- Deposition of Steven Schwartz, April 18, 2024.

Expert Reports

- Class Certification Expert Report of Steven Schwartz, Ph.D., February 8, 2024, and backup materials.

- Class Certification Expert Report of Professor Joost Rietveld, February 8, 2024.

Financial Filings

- Activision Blizzard, Inc., SEC Form 8-K for period ended December 31, 2022, filed on February 6, 2023.

- Devolver Digital, "Annual Report and Consolidated Financial Statements for the Year Ended 31 December 2022," May 3, 2023, available at

https://investors.devolverdigital.com/files/downloads-and-publications/DevolverDigital-Annual-Report-2022.pdf, accessed on May 6, 2024.

- Electronic Arts, "Electronic Arts Reports Q4 and FY23 Results," May 9, 2023, available at https://ir.ea.com/press-releases/press-release-details/2023/Electronic-Arts-Reports-Q4-and-FY23-Results/default.aspx, accessed on May 6, 2024.

- Snail, Inc., SEC Form 10-Q for period ended September 30, 2022, filed on December 15, 2022.

Industry Reports

- ██████████████████████████████████

- International Federation of the Phonographic Industry, "Global Music Report 2024: State of the Industry," available at https://www.ifpi.org/wp-content/uploads/2024/04/GMR_2024_State_of_the_Industry.pdf, accessed on May 5, 2024.

Pleadings

- Consolidated Second Amended Class Action Complaint, *In re: Valve Antitrust Litigation*, March 23, 2023.

Public Press and Other Web Content

- Adam Starkey, "Steam Players Hit Record High as PC Gaming Starts to Leave Consoles Behind," *Metro*, March 4, 2024, available at https://metro.co.uk/2024/03/04/steam-players-hit-record-high-pc-gaming-starts-leave-consoles-behind-20392984/, accessed on May 6, 2024.

- Andy Chalk, "Epic Goes on the Hunt for Even More Exclusives with a New Program Offering Bigger Payouts to Smaller Studios," *PC Gamer*, August 23, 2023, available at https://www.pcgamer.com/epic-goes-on-the-hunt-for-even-more-exclusives-with-a-new-program-offering-bigger-payouts-to-smaller-studios/, accessed on May 6, 2024.

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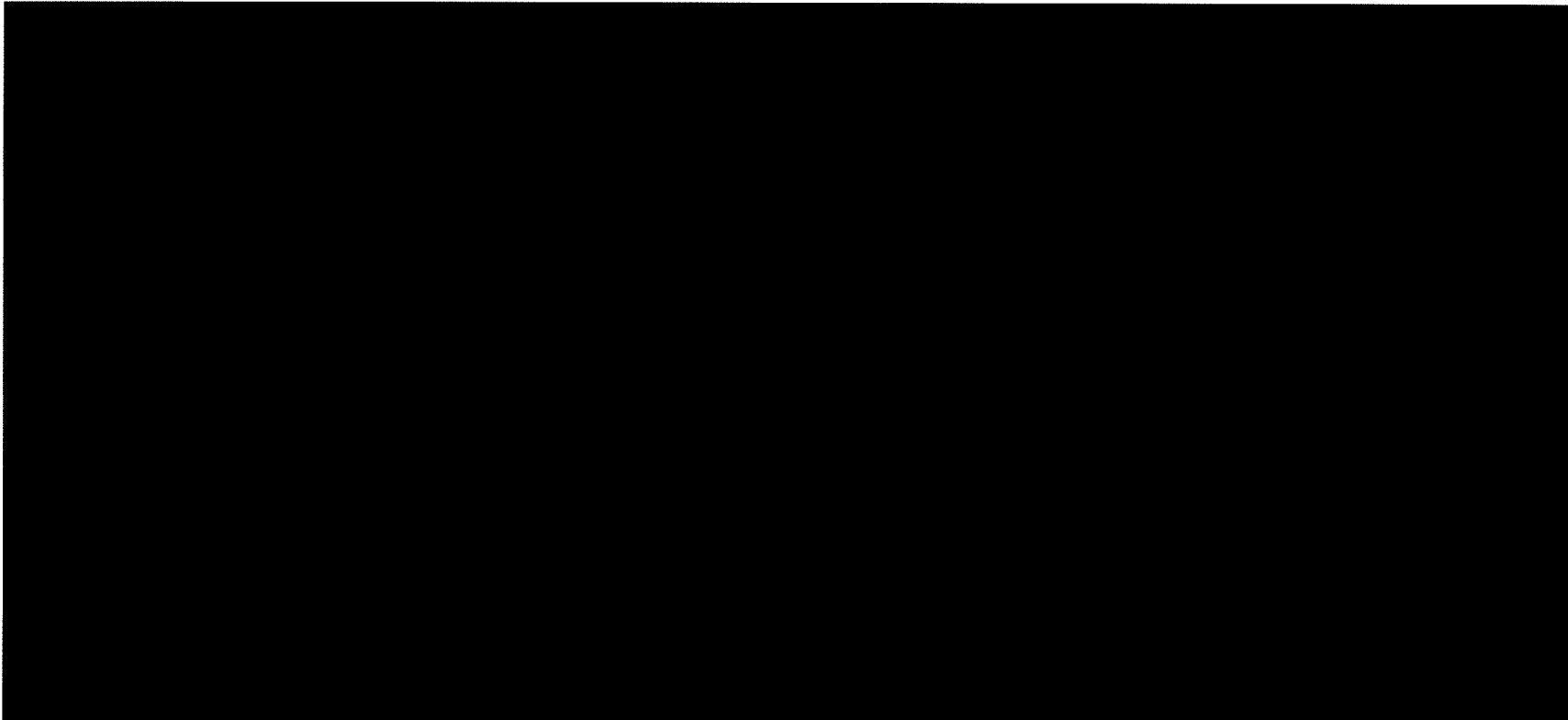
Note: In addition to the documents on this list, I relied upon all documents cited in my report, appendices, and exhibits to form my opinions.

10.   Appendix C: Steam key redemptions and issuances

Exhibit 8
Publishers vary in their use of Steam keys: Measured using Steam key redemptions

Source: *Schwartz Report and backup materials (Schwartz Analysis Data); Steam Key Redemptions Data*
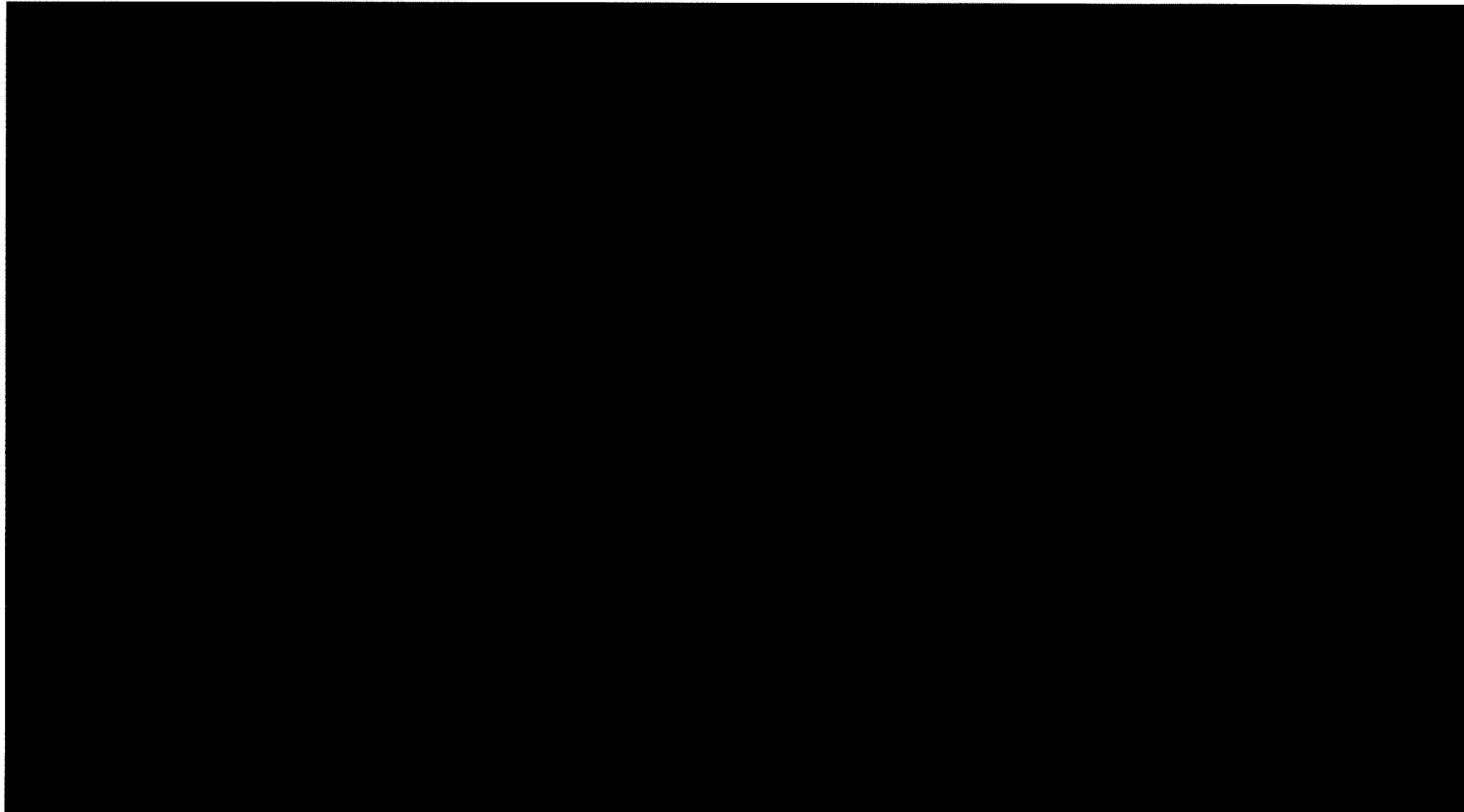Note:
The scale of both axes is logarithmic (values grow exponentially not linearly). Each point represents a single publisher. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Total revenues on Steam are calculated as the sum of package and microtransaction revenues. There were ▮▮▮ publishers, represented by blue dots along the horizontal axis, that had no Steam key redemptions between January 28, 2017 and December 31, 2022.

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Exhibit 9
Publishers vary in their use of Steam keys: Measured using Steam key issuances

Source: Schwartz Report and backup materials (Schwartz Analysis Data); Steam Key Requests Data
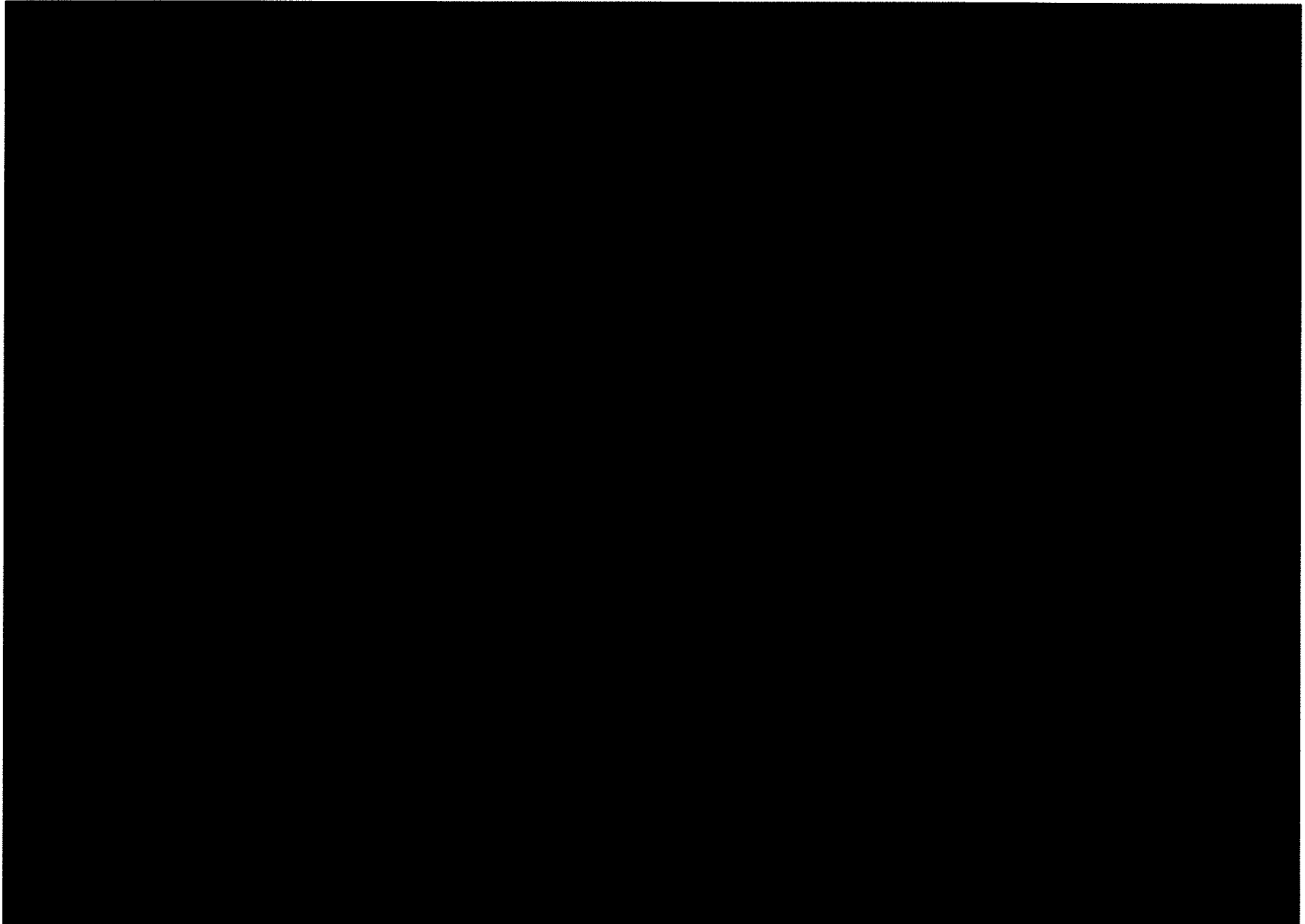Note:
The scale of both axes is logarithmic (values grow exponentially not linearly). Each point represents a single publisher. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Total revenues on Steam are calculated as the sum of package and microtransaction revenues. There were ▮▮▮ publishers, represented by blue dots along the horizontal axis, that had no Steam key issuances between January 28, 2017 and December 31, 2022.

11.   Appendix D: Steam key sensitivities

Exhibit 10

Varying assumptions about Steam key use leads to economically important changes in publisher-level harm: Top 100 publishers by Steam key redemption-to-Steam revenues ratio

Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Model Inputs, Schwartz Passthrough, Schwartz Valve Market Share on Steam); Steam Key Redemptions Data; Steam Key Requests Data

Note:

The effective revenue share rate for each publisher adopts the effective "take rate" as calculated by Dr. Schwartz, adding in the impact of Steam key redemptions or issuances and aggregating to the publisher level. These adjusted effective revenue shares are calculated using package unit sales, microtransaction sales, and package unit Steam key redemptions or issuances. See footnote 204 for more detail. To approximate the removal of Steam keys from the but-for world, I adjust each publisher's but-for world effective revenue share (which assumed the use of Steam keys) by removing the estimated revenue associated with Steam key redemptions or issuances and recalculating the effective revenue share. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Dr. Schwartz's 20 percent pass-through rate is used for this analysis. Following Dr. Schwartz's methodology, data records (including revenues, Steam key issuances, and Steam key redemptions) are limited to those that took place between January 28, 2017 and December 31, 2022 and, in the case of revenues, are recorded in USD.

Exhibit 11
Varying assumptions about Steam key use leads to economically important changes in publisher-level harm: Top 100 publishers by Steam key issuance-to-Steam revenues ratio

Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Model Inputs, Schwartz Passthrough, Schwartz Valve Market Share on Steam); Steam Key Redemptions Data; Steam Key Requests Data
Note:
The effective revenue share rate for each publisher adopts the effective "take rate" as calculated by Dr. Schwartz, adding in the impact of Steam key redemptions or issuances and aggregating to the publisher level. These adjusted effective revenue shares are calculated using package unit sales, microtransaction sales, and package unit Steam key redemptions or issuances. See footnote 204 for more detail. To approximate the removal of Steam keys from the but-for world, I adjust each publisher's but-for world effective revenue share (which assumed the use of Steam keys) by removing the estimated revenue associated with Steam key redemptions or issuances and recalculating the effective revenue share. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Dr. Schwartz's 20 percent pass-through rate is used for this analysis. Following Dr. Schwartz's methodology, data records (including revenues, Steam key issuances, and Steam key redemptions) are limited to those that took place between January 28, 2017 and December 31, 2022 and, in the case of revenues, are recorded in USD.

Exhibit 12
Varying assumptions about Steam key use leads to economically important changes in publisher-level harm: Top 100 publishers by Steam key redemption-to-Steam revenues ratio among publishers with at least $1 million in revenue

Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Model Inputs, Schwartz Passthrough, Schwartz Valve Market Share on Steam); Steam Key Redemptions Data; Steam Key Requests Data
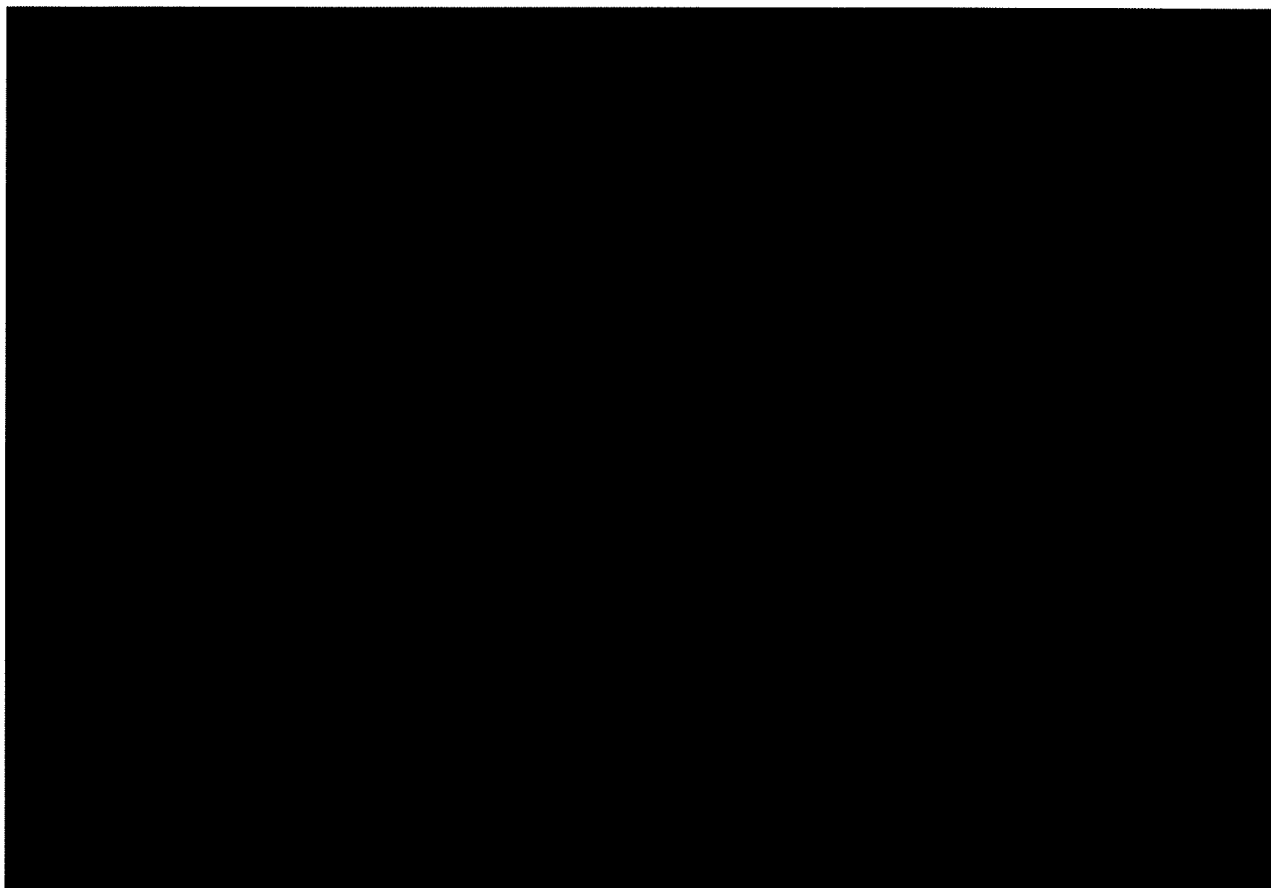Note:
The effective revenue share rate for each publisher adopts the effective "take rate" as calculated by Dr. Schwartz, adding in the impact of Steam key redemptions or issuances and aggregating to the publisher level. These adjusted effective revenue shares are calculated using package unit sales, microtransaction sales, and package unit Steam key redemptions or issuances. See footnote 204 for more detail. To approximate the removal of Steam keys from the but-for world, I adjust each publisher's but-for world effective revenue share (which assumed the use of Steam keys) by removing the estimated revenue associated with Steam key redemptions or issuances and recalculating the effective revenue share. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Dr. Schwartz's 20 percent pass-through rate is used for this analysis. Following Dr. Schwartz's methodology, data records (including revenues, Steam key issuances, and Steam key redemptions) are limited to those that took place between January 28, 2017 and December 31, 2022 and, in the case of revenues, are recorded in USD.

Exhibit 13

Varying assumptions about Steam key use leads to economically important changes in publisher-level harm: Top 100 publishers by Steam key issuance-to-Steam revenues ratio among publishers with at least $1 million in revenue

Source: Schwartz Report and backup materials (Schwartz Analysis Data, Schwartz Model Inputs, Schwartz Passthrough, Schwartz Valve Market Share on Steam); Steam Key Redemptions Data; Steam Key Requests Data

Note:

The effective revenue share rate for each publisher adopts the effective "take rate" as calculated by Dr. Schwartz, adding in the impact of Steam key redemptions or issuances and aggregating to the publisher level. These adjusted effective revenue shares are calculated using package unit sales, microtransaction sales, and package unit Steam key redemptions or issuances. See footnote 204 for more detail. To approximate the removal of Steam keys from the but-for world, I adjust each publisher's but-for world effective revenue share (which assumed the use of Steam keys) by removing the estimated revenue associated with Steam key redemptions or issuances and recalculating the effective revenue share. The exhibit includes U.S. publishers and foreign publishers with U.S. sales considered in Dr. Schwartz's damages calculations. Dr. Schwartz's 20 percent pass-through rate is used for this analysis. Following Dr. Schwartz's methodology, data records (including revenues, Steam key issuances, and Steam key redemptions) are limited to those that took place between January 28, 2017 and December 31, 2022 and, in the case of revenues, are recorded in USD.